VIRGINIA DIVISION OF MINERAL RESOURCES PUBLICATION 68

CLAY-MATERIAL SAMPLES COLLECTED 1981-1984

Palmer C. Sweet

COMMONWEALTH OF VIRGINIA

DEPARTMENT OF MINES, MINERALS AND ENERGY
DIVISION OF MINERAL RESOURCES
Robert C. Milici, Commissioner of Mineral Resources and State Geologist

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FRONT COVER: Railroad cut exposing light olive gray, diatomaceous clay (R-8613) of the Chesapeake Group southwest of Ruther Glen, Caroline County.

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DEPARTMENT OF MINES,
MINERALS AND ENERGY

RICHMOND, VIRGINIA

O. GENE DISHNER, Director

COMMONWEALTH OF VIRGINIA
DEPARTMENT OF PURCHASE AND SUPPLY
RICHMOND

1986

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ABSTRACT

This report contains the results of tests on the properties of clay, shale, and related materials required to evaluate their potential use for ceramic and nonceramic products. A total of 75 samples, collected in 29 counties and one independent city in Virginia between May, 1981 and July, 1984, were tested. These tests indicate that the material represented by 51 of the samples (68%) is potentially suitable for use as structural clay products (building brick, floor brick, structural tile), super-duty and medium-duty refractories, or lightweight aggregate.

INTRODUCTION

This is the eighth study published by the Virginia Division of Mineral Resources containing field and laboratory data on clay materials relating to their potential uses as ceramic and nonceramic products. In the previous seven studies (Table 1), a total of 575 samples collected in Virginia were determined to have some potential commercial value. In the present study, 51 additional samples were found to be potentially suitable for use as structural clay products (building brick, floor brick, structural tile), super-duty and medium-duty refractories, or lightweight aggregate. Sample locations are indicated on a generalized county-outline map of Virginia (Figure 1) and on county maps; specific location data for the samples are given with individual sample descriptions. UTM (Universal Transverse Mercator) coordinates and roadway numbers that do not appear on the county maps are on the quadrangle maps named in the location descriptions.

Table 1. Virginia Division of Mineral Resources reports on clay materials.

Area	Publication	Author	Date
Northern counties	MRR-2	Calver, J.L. and others	1961
West-Central counties	MRR-5	Calver, J.L. and others	1964
Southwestern counties	MRR-6	Johnson, S.S. and others	1966
Eastern counties	MRR-8	Johnson, S.S. and Tyrell, M.E.	1967
Southern counties	MRR-12	Sweet, P. C.	1973
Statewide	MRR-13	Sweet, P. C.	1976
Statewide	Pub. 36	Sweet, P. C.	1982

Predominantly, miscellaneous clay materials were suitable for structural clay products. Some materials potentially suitable for use in making refractories (Table 2) are in Albemarle County and Charlottesville (R-8616 and R-8629). Five samples (R-8561, R-8570B, R-8604, R-8616, R-8645, and R-8713) were evaluated for their potential use in mineral fillers and extenders by reflectance tests

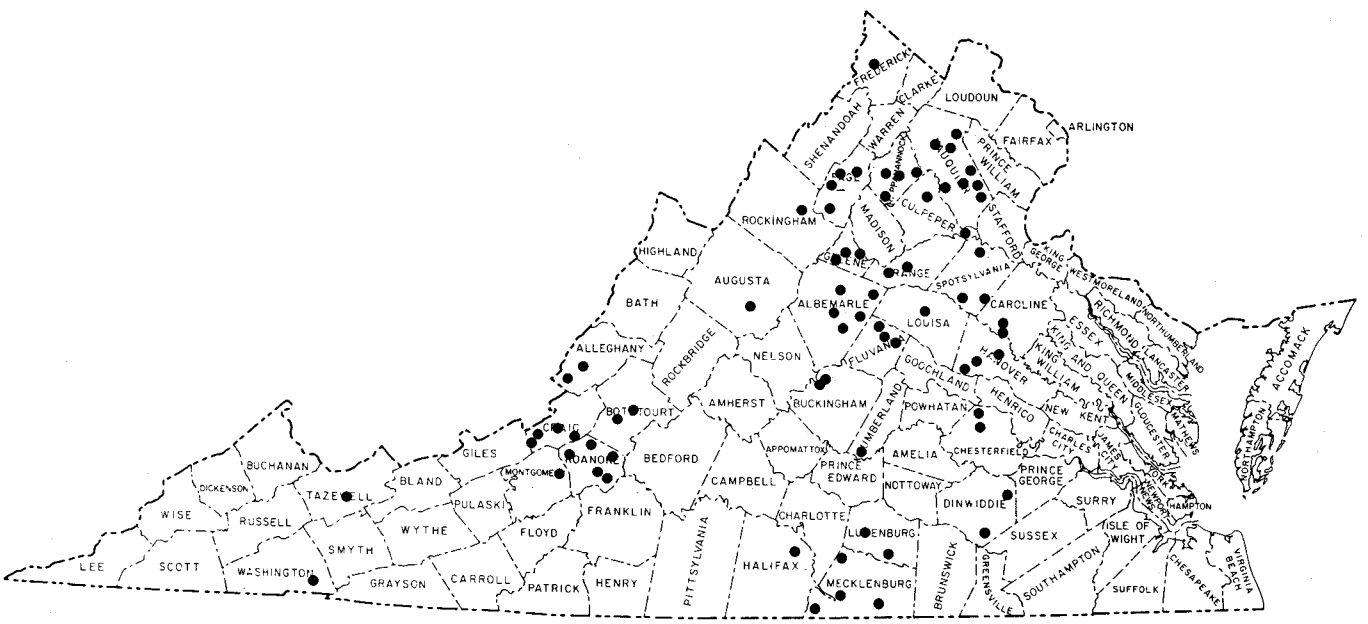


Figure 1. General location map of clay material samples.

Table 2. Samples potentially suitable for refractories[1].

County	Repository Number	Pyrometric Cone Equivalent	Refractories Use
Albemarle	R-8629	33 (3,169°F)	Super-Duty
Charlottesville (City of)	R-8616	29 (3,018°F)	Medium-Duty

Table 3. Reflectance Tests[1]

County	Repository Number	Brightness	Whiteness
Augusta	R-8713	72.5	52.5
Charlottesville (City of)	R-8616	65.8	6.6
Hanover	R-8645	78.0	49.2
Page	R-8570-B	85.5	71.5
Roanoke	R-8604	59.8	30.6
Washington	R-8561	72.0	56.0

[1]Tests made by the U. S. Bureau of Mines, Tuscaloosa Research Center.

expressed in brightness and whiteness values (Table 3). Four samples tested positive on the preliminary bloating test and an additional bloating test was performed on each sample. Tests on samples from Alleghany (R-8568), Botetourt (R-8510, R-8511), and Caroline (R-8613) counties indicate a potential for lightweight aggregate.

Tests were performed by the U. S. Bureau of Mines Tuscaloosa Research Center at Tuscaloosa, Alabama, under a cooperative program with the Virginia Division of Mineral Resources. Splits of samples are on file in the Division's rock repository where they are available for examination. Evaluations are based on test data from a single sample or from a small number of samples considered to be representative of material at the sampling site. Samples from other parts of the pit or roadcut may not have the same physical characteristics as those determined for the sample that was tested. Additional sampling and testing should be carried out to assess the potential for commercial development of the material at any particular locality.

NOTES ON SAMPLE INFORMATION

Descriptions of individual samples are arranged alphabetically by county. Information for the samples includes, in order: the sample number and its county or city location; the date that samples were submitted for analysis and the name of the laboratory performing the tests; detailed location data, with UTM (Universal Transverse Mercator) coordinates, for example, N4,083,240, E698,910 - Zone 17, the name of the 7.5-minute quadrangle in which the sample site is located, and other descriptive information; a hand-sample description of the material from which the sample was taken; formation or age; descriptions of the sample interval, and of the raw properties of the material; slow-firing test results and a preliminary bloating test; and the potential use of the material.

The glossary contains information helpful in interpreting descriptions and test results.

Abbreviations, Symbols, and Terms Used in Tables.

Abbreviations:
- Abs. — Absorption
- Appar. Poros. — Apparent porosity
- Lin. Shk. — Linear shrinkage
- LOF — Loss on firing (chemical analyses)
- USBM-15.6 — weight percent as determined by U.S. Bureau of Mines

Symbols:
- — test not performed; or not applicable

Terms: Color as used in slow firing test is based on Munsel Book of Colors, 1973, Neighboring Hues Edition: Newburg, New York, Kollomorgan Corp.

All chemical analyses are in weight percent.

SAMPLE DESCRIPTIONS, CHARACTERISTICS, AND EVALUATIONS

SAMPLE: R-8523 COUNTY: Albemarle

DATE: June, 1982 — Tuscaloosa Research Center

LOCALITY: N4,219,640 E737,410 (Zone 17). Keswick 7.5' quadrangle. Roadcut, 2.5 miles north of Cobham, on the southwest side of State Road 640, approximately 1.1 miles by road northwest of its intersection with Virginia Highway 231.

DESCRIPTION: Pale to moderate reddish-brown plastic clay, with mottled cream and grayish-orange to dark yellowish-orange clay, is present in a 175-foot-long roadcut that has a maximum height of 9 feet. This residual clay over the Catoctin Formation is underlain by a grayish-yellow, silty unconsolidated material.

FORMATION OR AGE: Residual clay

SAMPLED INTERVAL: Representative composite sample across 7 feet of clay.

RAW PROPERTIES:

Working properties:	plastic
Water of plasticity:	37.0%
Drying shrinkage:	7.5%
Dry strength:	good
pH:	4.8

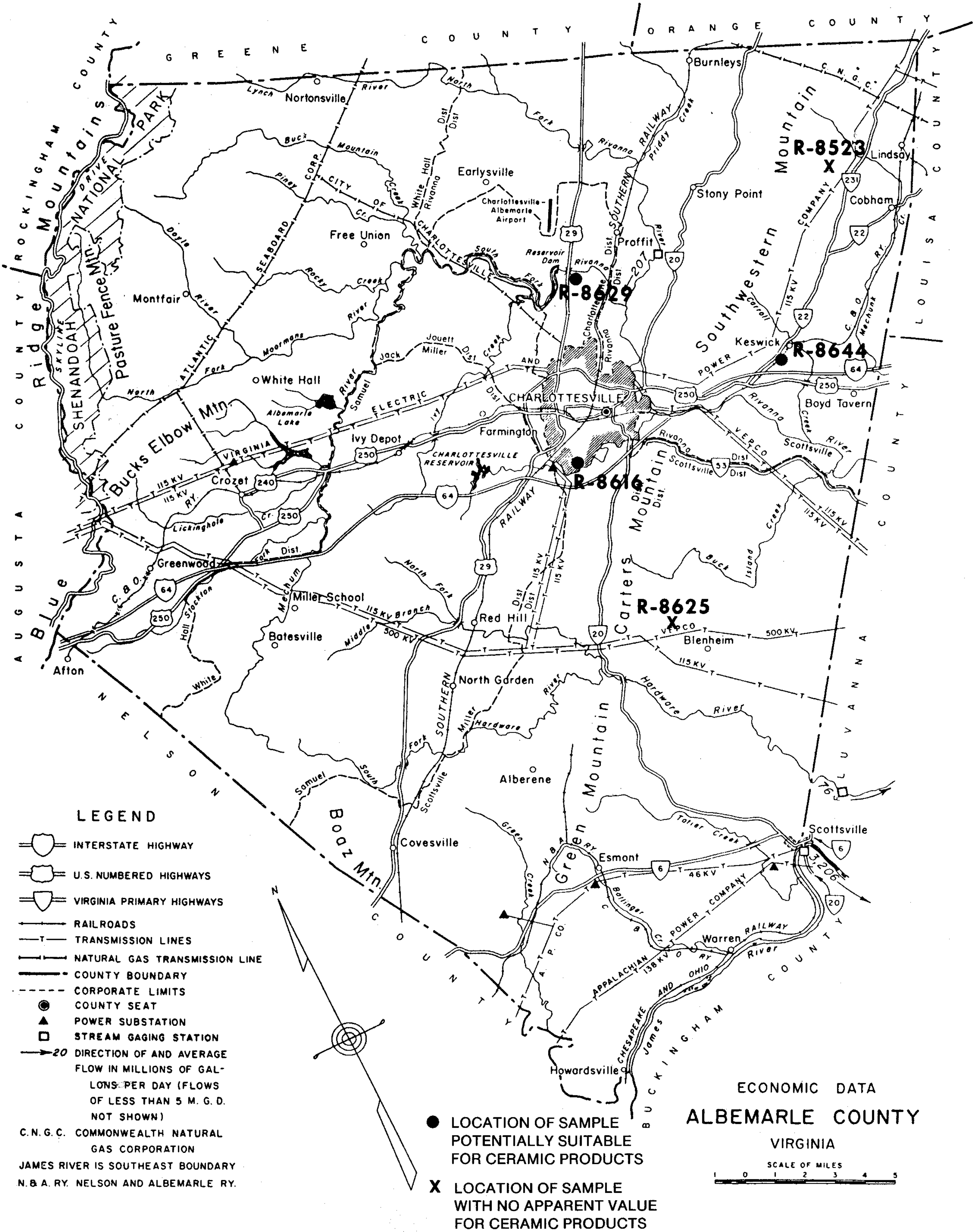
SLOW FIRING TEST:

Temp. °C	*Color*	*Hard-ness*	*%Lin. Shk.*	*% Abs.*	*% Appr. Por.*	*Bulk Dens. gm/cc*
1000	Brownish-orange	3	12.5	28.0	46.9	1.67
1050	Brownish-orange	3	12.5	23.1	41.7	1.80
1100	Grayish-reddish-orange	4	15.0	14.2	30.5	2.15
1150	Grayish-reddish-orange	5	17.5	7.7	18.6	2.31
1200	Strong brown	6	20.0	7.5	17.9	2.49
1250	Strong brown	6	22.5	5.5	14.2	2.58

Remarks: High shrinkage at maturity; no effervescence with HCl.

PRELIMINARY BLOATING TEST: Negative

POTENTIAL USE: Not suitable for structural clay products.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1 0 1 2 3 4 5
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INTERSTATE HIGHWAY
U.S. NUMBERED HIGHWAYS
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C. N. G. C. COMMONWEALTH NATURAL GAS CORPORATION
JAMES RIVER IS SOUTHEAST BOUNDARY
N. & A. RY. NELSON AND ALBEMARLE RY.
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X LOCATION OF SAMPLE WITH NO APPARENT VALUE FOR CERAMIC PRODUCTS
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R-8629
R-8644
R-8616
R-8625
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ORANGE COUNTY
LOUISA COUNTY
FLUVANNA COUNTY
BUCKINGHAM COUNTY
NELSON COUNTY
AUGUSTA COUNTY
ROCKINGHAM COUNTY
CHARLOTTESVILLE
Burnleys
Nortonsville
Earlysville
Stony Point
Lindsay
Cobham
Free Union
Proffit
Montfair
Keswick
White Hall
Boyd Tavern
Farmington
Ivy Depot
Crozet
Greenwood
Miller School
Red Hill
Batesville
Blenheim
Afton
North Garden
Alberene
Covesville
Scottsville
Esmont
Warren
Howardsville
Charlottesville-Albemarle Airport
CHARLOTTESVILLE RESERVOIR
Albemarle Lake
Reservoir Dam
Blue Ridge
Bucks Elbow Mtn.
Pasture Fence Mtn.
SHENANDOAH NATIONAL PARK
SKYLINE DRIVE
Southwestern Mountain
Carters Mountain
Green Mountain
Boaz Mtn.
N

Figure 2.

SAMPLE: R-8616 COUNTY: Albemarle (City of Charlottesville)

DATE: July, 1983 — Tuscaloosa Research Center

LOCALITY: N4,209,840 E719,100 (Zone 17). Charlottesville West 7.5' quadrangle. Hillside cut off the northwest side of 5th Street Extended approximately 0.35 mile by road northeast of its intersection with Interstate 64.

DESCRIPTION: A white to very pale orange and grayish-orange weathered felsite dike with some dark brown and dark yellowish-orange stain and inclusions is present in a hillside cut. The material is very clayey in the western part of the dike, which has a strike of N15°E, and grades towards hard material to the east.

FORMATION OR AGE: Residuum over felsite dike.

SAMPLED INTERVAL: Representative sample across 2.5 feet of weathered dike material.

RAW PROPERTIES:

Working properties:	plastic
Water of plasticity:	40.7%
Drying shrinkage:	5.0%
Dry strength:	good
pH:	7.2

SLOW FIRING TEST:

Temp. °C	*Color*	*Hard-ness*	*%Lin. Shk.*	*% Abs.*	*% Appr. Por.*	*Bulk Dens. gm/cc*
1000	Pale yellowish-pink	2	2.5	36.8	49.2	1.34
1050	Pale yellowish-pink	2	2.5	36.3	48.8	1.35
1100	Pinkish-white	2	2.5	30.3	44.2	1.46
1150	Pinkish-white	3	7.5	25.9	40.3	1.56
1200	White	5	10.0	20.2	34.4	1.70
1250	White	5	10.0	17.9	31.6	1.77

Remarks: No effervescence with HCl.

PRELIMINARY BLOATING TEST: Negative

PYROMETRIC CONE EQUIVALENT: 29 (3,018°F)

REFLECTANCE TESTS: Brightness 65.8; tint 14.8; whiteness 6.6

POTENTIAL USE: Medium-duty refractory; structural clay products (e.g., building brick, structural tile at 1200°-1250 C).

SAMPLE: R-8625 COUNTY: Albemarle

DATE: July, 1983 — Tuscaloosa Research Center

LOCALITY: N4,200,300 E719,690 (Zone 17) Alberene 7.5' quadrangle. Roadcut, 1.7 miles northwest of Blenheim, on the west side of State Road 727, approximately 1.2 miles south of its intersection with State Road 627.

DESCRIPTION: Reddish brown slightly plastic clay is present in a 60-foot-long roadcut that has a maximum height of 7 feet. Bits of gray schist, with some pale to dark yellowish-orange plastic material, are present near the middle of the roadcut.

FORMATION OR AGE: Residual clay

SAMPLED INTERVAL: Composite channel sample across 7 feet of clay.

RAW PROPERTIES:

Working properties:	plastic
Water of plasticity:	36.8%
Drying shrinkage:	5.0%
Dry strength:	good
pH:	5.6

SLOW FIRING TEST:

Temp. °C	*Color*	*Hard-ness*	*%Lin. Shk.*	*% Abs.*	*% Appr. Por.*	*Bulk Dens. gm/cc*
1000	Brownish-orange	3	7.5	24.4	42.0	1.72
1050	Brownish-orange	3	7.5	21.4	38.7	1.80
1100	Grayish-reddish-orange	5	17.5	7.1	17.2	2.43
1150	Light reddish-brown	6	17.5	5.2	13.1	2.52
1200	Strong brown	6	20.0	4.0	10.3	2.56
1250	Moderate reddish-brown	6	20.0	3.1	8.0	2.60

Remarks: High shrinkage at maturity; no effervescence with HCl.

PRELIMINARY BLOATING TEST: Negative

POTENTIAL USE: Not suitable for structural clay products.

SAMPLE: R-8629 COUNTY: Albemarle

DATE: July, 1983 — Tuscaloosa Research Center

LOCALITY: N4,219,420 E722,390 (Zone 17) Charlottesville East 7.5' quadrangle. Hillside cut off the southeast side of U.S. Highway 29 approximately 0.3 mile by road southwest of its crossing over the South Fork of the Rivanna River.

DESCRIPTION: A white, very pale orange and pale yellowish-orange weathered felsite dike with some dark, brown joint fillings is present in a long hillside cut. Graphite schist is present on both sides of the dike and stratigraphically below is a weathered sandy-sericite schist. The dike, which grades from semi-hard to soft, has a strike of N55°E and a dip of 65-75°SE.

FORMATION OR AGE: Residuum over felsite dike.

SAMPLED INTERVAL: Representative sample across 11 feet of residuum.

RAW PROPERTIES:

Working properties:	plastic
Water of plasticity:	32.3%
Drying shrinkage:	2.5%
Dry strength:	good
pH:	5.4

SLOW FIRING TEST:

Temp. °C	*Color*	*Hard-ness*	*%Lin. Shk.*	*% Abs.*	*% Appr. Por.*	*Bulk Dens. gm/cc*
1000	Pale yellowish-pink	3	5.0	36.5	51.4	1.41
1050	Pale yellowish-pink	3	5.0	31.0	45.5	1.47
1100	Pale yellowish-pink	3	5.0	30.5	45.0	1.47
1150	Pinkish-white	3	5.0	29.3	44.2	1.51
1200	Pinkish-white	3	7.5	22.2	38.3	1.73
1250	Pinkish-white	3	10.0	19.9	35.1	1.77

Remarks: Too soft; not suitable for structural clay products; no effervescence with HCl.

PRELIMINARY BLOATING TEST: Negative

PYROMETRIC CONE EQUIVALENT: 33 (3,169°F)

POTENTIAL USE: Super-duty refractory

SAMPLE: R-8644 COUNTY: Albemarle

DATE: November, 1983 — Tuscaloosa Research Center

LOCALITY: N4,211,110 E731,550 (Zone 17) Keswick 7.5' quadrangle. Railroad cut, 0.3 mile southwest of Keswick, on the south side of the Chessie Systems Railway approximately 0.15 mile east of its crossing over State Road 731.

DESCRIPTION: Light brown to pale reddish-brown and dark red weathered schist and mottled very pale orange, grayish-pink, and moderate orangish-pink to dark yellowish-orange plastic clay are present in a long railroad cut that has a maximum height of 15 feet. Dark red schist occurs below this material.

FORMATION OR AGE: Saprolite and residual clay

SAMPLED INTERVAL: Composite channel sample across top 8 feet of a 15-foot-high railroad cut.

RAW PROPERTIES:

Working properties:	plastic
Water of plasticity:	34.9%
Drying shrinkage:	5.0%
Dry strength:	good
pH:	7.2

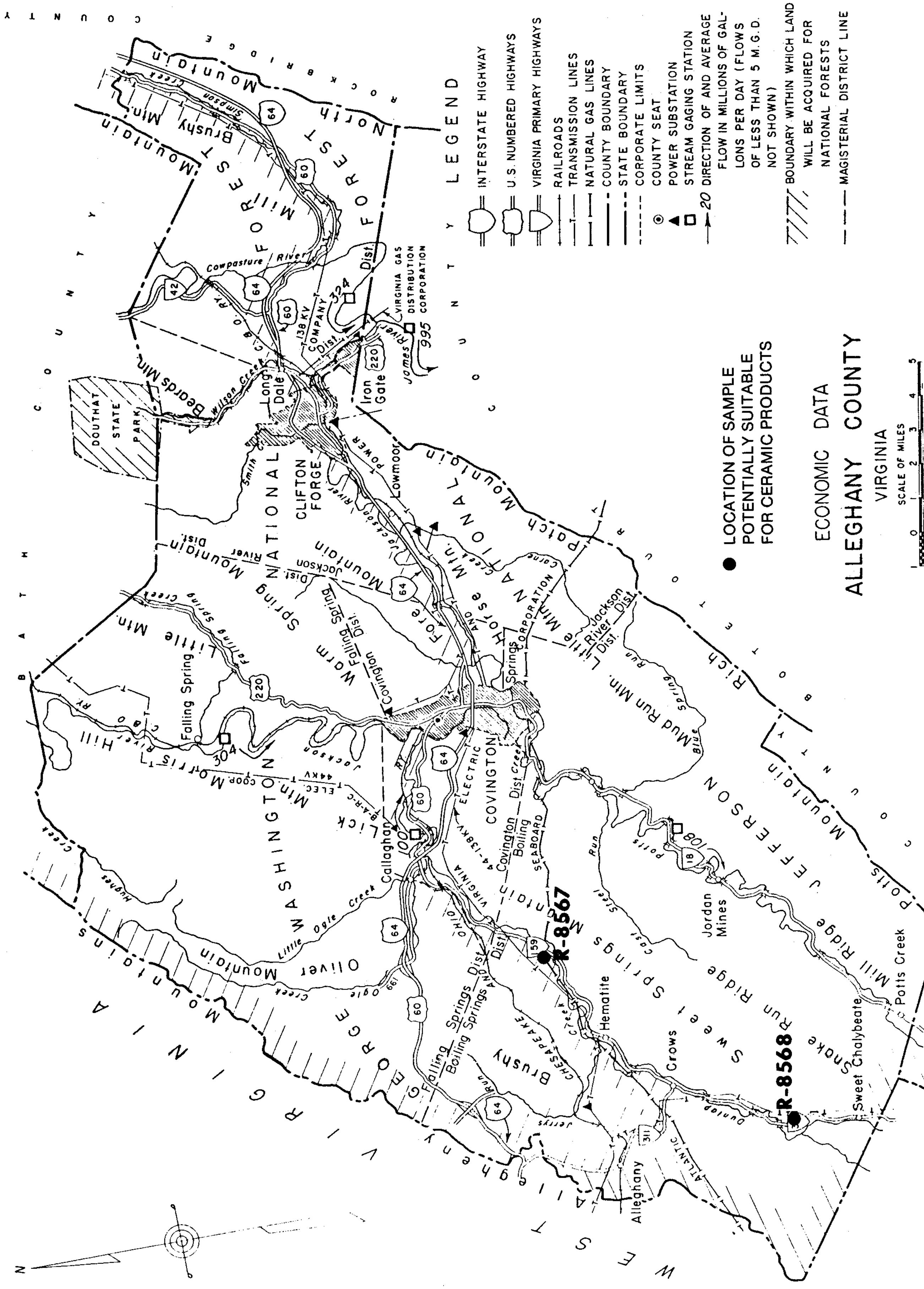
SLOW FIRING TEST:

Temp. °C	*Color*	*Hard-ness*	*%Lin. Shk.*	*% Abs.*	*% Appr. Por.*	*Bulk Dens. gm/cc*
1000	Moderate orange	3	5.0	35.0	48.9	1.40
1050	Moderate orange	3	5.0	32.7	47.5	1.45
1100	Moderate orange	3	7.5	27.6	42.8	1.55
1150	Moderate orange	3	7.5	25.0	41.0	1.64
1200	Brownish-orange	4	10.0	20.8	36.0	1.73
1250	Grayish-reddish-orange	4	10.0	16.7	30.9	1.85

Remarks: No effervescence with HCl.

PRELIMINARY BLOATING TEST: Negative

POTENTIAL USE: Structural clay products (e.g., building brick at 1200°-1250°C).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ECONOMIC DATA
ALLEGHANY COUNTY
VIRGINIA
SCALE OF MILES
R-8567
R-8568

Figure 3.

SAMPLE: R-8567 COUNTY: Alleghany

DATE: October, 1982 — Tuscaloosa Research Center

LOCALITY: N4,180,400 E578,000 (Zone 17) Callaghan 7.5' quadrangle. Roadcut, 3.7 miles southwest of Callaghan, on the northwest side of Virginia Highway 159, 1.0 miles by road northeast of its crossing over Dunlap Creek.

DESCRIPTION: Light olive gray to olive gray, silty shale is exposed in a long roadcut that has a maximum height of 15 feet. Where the shale is fractured, peg-shaped fragments are formed; bedding planes are stained grayish-orange and dull red by iron oxide. The shale has a strike of N50°E and a dip of 15°NW.

FORMATION OR AGE: Devonian

SAMPLED INTERVAL: Representative sample across 18 feet of shale.

RAW PROPERTIES:

Working properties:	short
Water of plasticity:	15.6%
Drying shrinkage:	2.5%
Dry strength:	fair
pH:	6.1

SLOW FIRING TEST:

Temp. °C	*Color*	*Hard-ness*	*%Lin. Shk.*	*% Abs.*	*% Appr. Por.*	*Bulk Dens. gm/cc*
1000	Moderate orange	3	5.0	14.4	27.8	1.93
1050	Moderate orange	3	5.0	11.6	23.7	2.04
1100	Brownish-orange	4	7.5	7.2	15.9	2.21
1150	Light reddish-brown	4	7.5	5.2	11.8	2.26
1200	Moderate reddish-brown	5	7.5	3.9	8.8	2.27
1250	—		Expanded	—	—	—

Remarks: No effervescence with HCl.

PRELIMINARY BLOATING TEST: Positive

BLOATING TEST:

Temp. °C	*Percent Absorption*	*Bulk Dens. gm/cc (lb/ft ^{3})*	*Remarks*
1050	5.0	1.94 (120.8)	No expansion
1100	5.6	1.68 (104.7)	Slight expansion
1150	7.1	1.05 (65.5)	Good pore structure
1200	8.3	.84 (52.4)	Some large pores

POTENTIAL USE: Structural clay products (e.g., building brick at 1100°-1200°C). Lightweight aggregate at 1150°-1200°C.

SAMPLE: R-8568 COUNTY: Alleghany

DATE: October, 1982 — Tuscaloosa Research Center

LOCALITY: N4,169,760 E567,640 (Zone 17) Alleghany 7.5' quadrangle. Roadcut, 2.0 miles north of Sweet Chalybeate, on the northeast side of Virginia Highway 311, 0.3 mile by road south of its intersection with State Road 604.

DESCRIPTION: Olive gray to medium dark gray fissile shale is present in a long roadcut that has a maximum height of 20 feet. The shale weathers to form grayish-orange and light gray angular fragments. A thin red siltstone in the northern part of the exposure was not sampled. The shale is contorted in places; grayish-orange and light brown iron oxide stain is present along bedding and also along joints, which dip 45°SE.

FORMATION OR AGE: Brallier shale

SAMPLED INTERVAL: Representative sample taken across 100 feet of shale.

RAW PROPERTIES:

Working properties:	short
Water of plasticity:	16.6%
Drying shrinkage:	2.5%
Dry strength:	fair
pH:	6.4

SLOW FIRING TEST:

Temp. °C	*Color*	*Hard-ness*	*%Lin. Shk.*	*% Abs.*	*% Appr. Por.*	*Bulk Dens. gm/cc*
1000	Orange	3	2.5	15.1	28.7	1.90
1050	Light orange	4	5.0	11.8	23.9	2.02
1100	Light orange	5	7.5	2.5	6.1	2.46
1150	—	—	Expanded	—	—	—
1200	—	—	—	—	—	—
1250	—	—	—	—	—	—

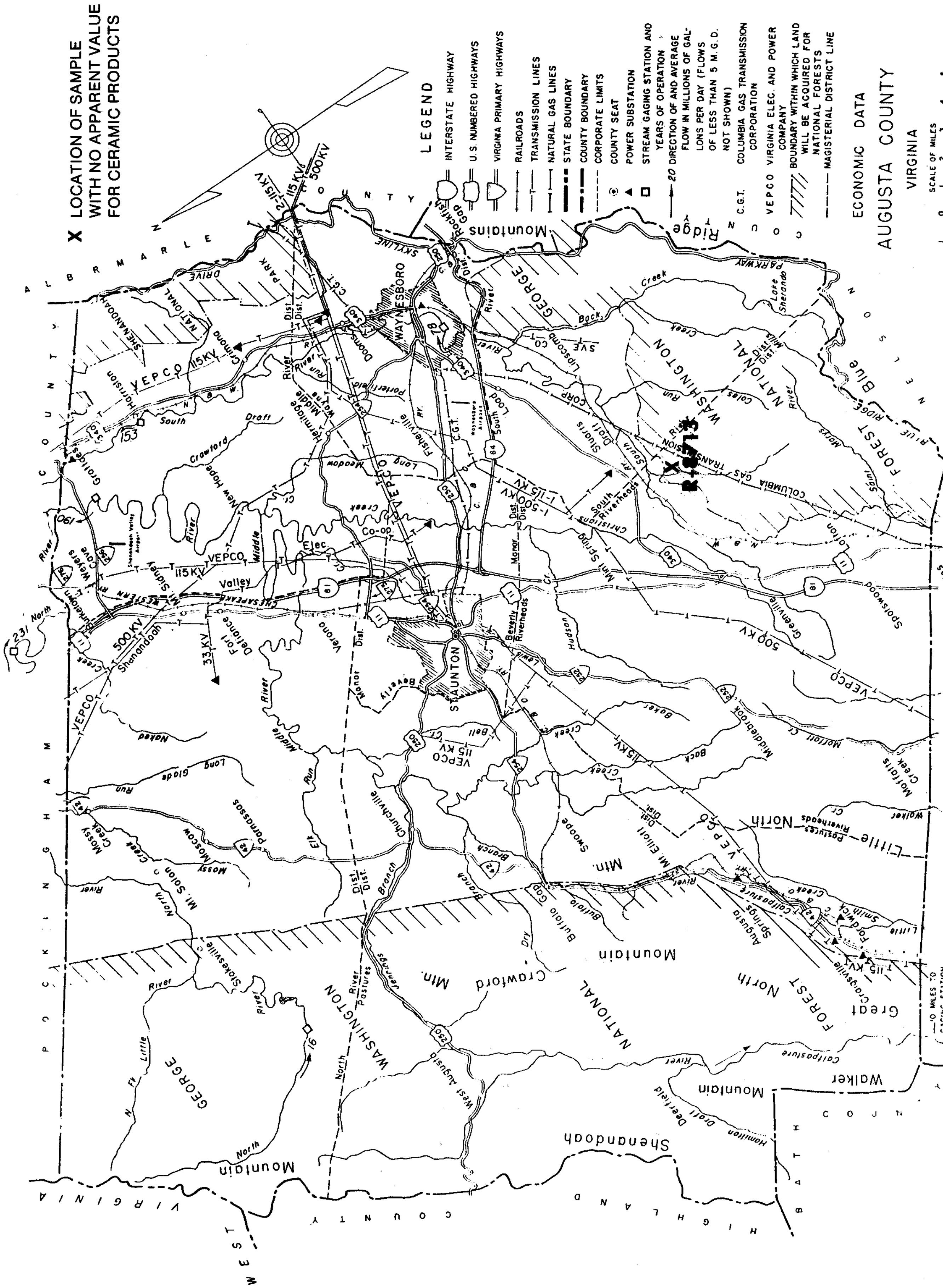
Remarks: Short firing range; abrupt vitrification between 1050°-1100°C; no effervescence with HCl.

PRELIMINARY BLOATING TEST: Positive

BLOATING TEST:

Temp. °C	*Percent Absorption*	*Bulk Dens. gm/cc (lb/ft³)*	*Remarks*
1050	7.1	1.79 (111.4)	Slight expansion
1100	9.9	1.47 (91.9)	Partial expansion
1150	10.2	.98 (61.3)	Good pore structure
1200	8.5	.82 (51.3)	Some large pores

POTENTIAL USE: Structural clay products (e.g., building brick at 1050°C). Lightweight aggregate at 1150°-1200°C.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BATH COUNTY
NELSON COUNTY
WEST VIRGINIA
STAUNTON
WAYNESBORO
R-6813

Figure 4.

SAMPLE: R-8713 COUNTY: Augusta

DATE: July, 1984 — Tuscaloosa Research Center

LOCALITY: N4,208,840 E669,000 (Zone 17), Stuarts Draft, 7.5' quadrangle. Bottom of sand and gravel pit of Eavers Brothers Extracting, Inc., off southeast side of State Road 608 approximately 0.25 mile by road southeast of its intersection with State Road 656.

DESCRIPTION: Pinkish-white to white leached shale saprolite of the Rome Formation is present below a sand and gravel deposit.

FORMATION OR AGE: Leached shale saprolite of the Rome Formation.

SAMPLED INTERVAL: Representative sample from bottom of pit.

RAW PROPERTIES:

Working properties:	plastic
Water of plasticity:	49.1%
Drying shrinkage:	10.0%
Dry strength:	good
pH:	8.3

SLOW FIRING TEST:

Temp. °C	*Color*	*Hard-ness*	*%Lin. Shk.*	*% Abs.*	*% Appr. Por.*	*Bulk Dens. gm/cc*
1000	Moderate orangish-pink	4	12.5	30.7	44.2	1.44
1050	Very pale orange	4	12.5	29.7	43.9	1.48
1100	Very pale orange	4	12.5	23.7	38.5	1.62
1150	Yellowish-gray	5	15.0	18.7	32.7	1.75
1200	Grayish-yellow	5	15.0	15.2	27.9	1.84
1250	Grayish-yellow	6	17.5	14.2	26.7	1.87

Remarks: High shrinkage, high absorption; no effervescence with HCl.

PRELIMINARY BLOATING TEST: Negative

REFLECTANCE TESTS: Brightness 72.5; tint 5.0; whiteness 52.5

POTENTIAL USE: Not suitable for structural clay products.

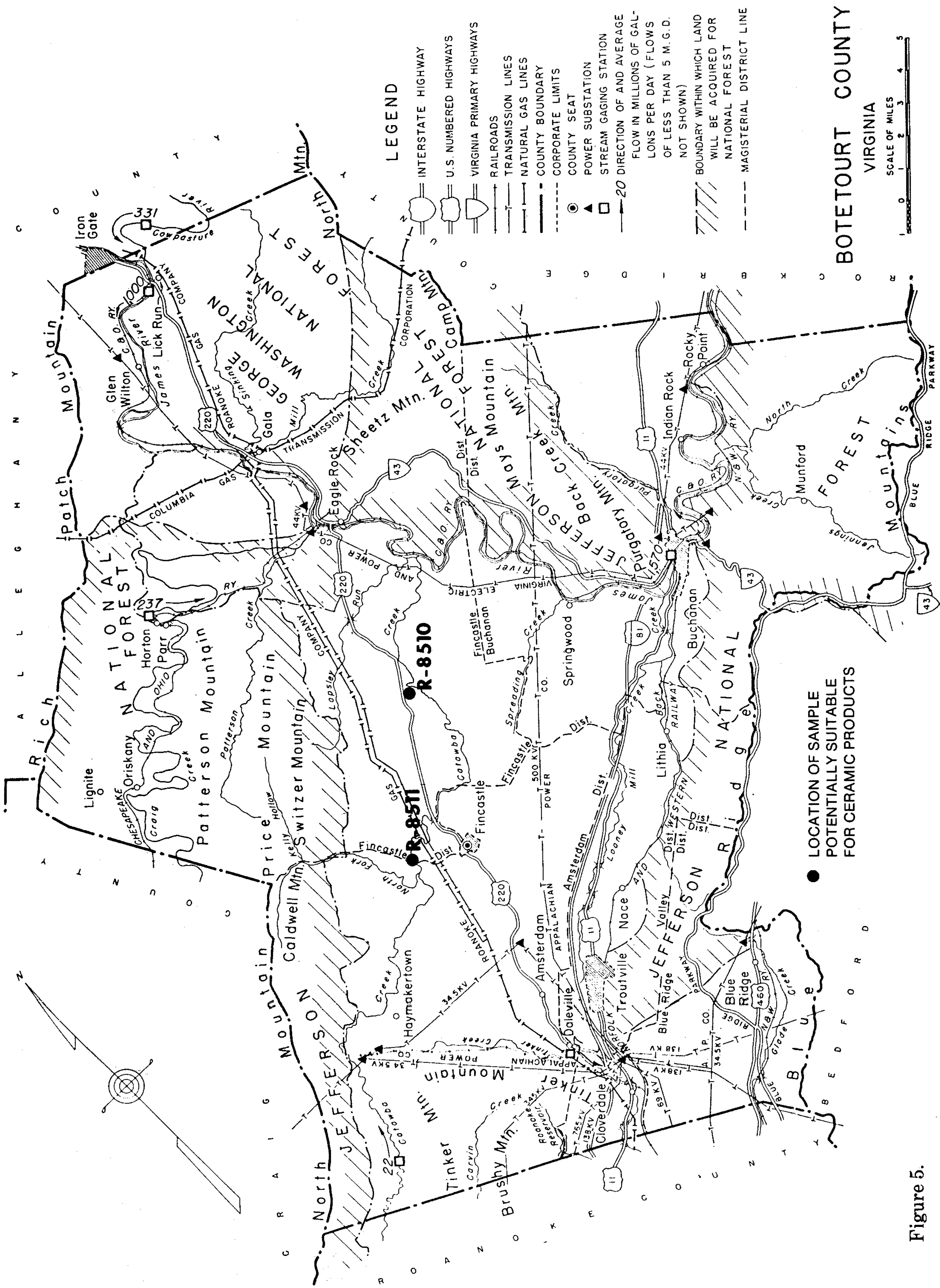

LEGEND
INTERSTATE HIGHWAY
U.S. NUMBERED HIGHWAYS
VIRGINIA PRIMARY HIGHWAYS
RAILROADS
TRANSMISSION LINES
NATURAL GAS LINES
COUNTY BOUNDARY
CORPORATE LIMITS
COUNTY SEAT
POWER SUBSTATION
STREAM GAGING STATION
20 DIRECTION OF AND AVERAGE FLOW IN MILLIONS OF GALLONS PER DAY (FLOWS OF LESS THAN 5 M.G.D. NOT SHOWN)
BOUNDARY WITHIN WHICH LAND WILL BE ACQUIRED FOR NATIONAL FOREST
MAGISTERIAL DISTRICT LINE
BOTETOURT COUNTY
VIRGINIA
SCALE OF MILES
0 1 2 3 4 5
LOCATION OF SAMPLE POTENTIALLY SUITABLE FOR CERAMIC PRODUCTS
R-8510
R-8511
ALLEGHANY COUNTY
CRAIG COUNTY
ROANOKE COUNTY
BEDFORD COUNTY
ROCKBRIDGE COUNTY
GEORGE WASHINGTON NATIONAL FOREST
JEFFERSON NATIONAL FOREST
Fincastle
Buchanan
Eagle Rock
Troutville
Daleville
Cloverdale
Amsterdam
Springwood
Blue Ridge

Figure 5.

SAMPLE: R-8510 COUNTY: Botetourt

DATE: January, 1982 — Tuscaloosa Research Center

LOCALITY: N4,158,060 E602,090 (Zone 17) Salisbury 7.5' quadrangle. Roadcut 4.8 miles north-northeast of Fincastle, on the east side of U. S. Hwy. 220, approximately 0.65 mile by road north of its intersection with State Road 635.

DESCRIPTION: Dark and dusky yellowish-brown and grayish orange, slightly calcareous and silty shale is present in a long roadcut that has a maximum height of 6 feet. The shale has a strike of N48°E and a dip of 55°NW.

FORMATION OR AGE: Martinsburg Formation

SAMPLED INTERVAL: Representative composite sample across 30 feet of shale.

RAW PROPERTIES:

Working properties:	plastic
Water of plasticity:	22.0%
Drying shrinkage:	5.0%
Dry strength:	good
pH:	7.8%

SLOW FIRING TEST:

Temp. °C	*Color*	*Hard-ness*	*%Lin. Shk.*	*% Abs.*	*% Appr. Por.*	*Bulk Dens. gm/cc*
1000	Moderate orange	3	5.0	15.1	28.5	1.89
1050	Brownish-orange	5	7.5	10.5	21.4	2.04
1100	Strong brown	6	10.0	4.0	9.0	2.27
1150	Moderate reddish-brown	6	10.0	2.8	6.3	2.27
1200	—	—	Expanded	—	—	—
1250	—	—	—	—	—	—

Remarks: Short firing range (1100° -1150° C); no effervescence with HCl.

PRELIMINARY BLOATING TEST: Positive

BLOATING TEST:

Temp. °C	*Percent Absorption*	*Bulk Dens. gm/cc (lb/ft ^{3})*	*Remarks*
1050	11.4	1.87 (116.8)	No expansion
1100	6.7	1.25 (78.2)	Good pore structure
1150	3.4	.71 (44.2)	Overfired (sticky)
1200	5.4	.70 (43.7)	Overfired (sticky)

POTENTIAL USE: Structural clay products (e.g., building brick at 1050°-1150°C). Marginal for lightweight aggregate.

SAMPLE: R-8511 COUNTY: Botetourt

DATE: January, 1982 — Tuscaloosa Research Center

LOCALITY: N4,151,000 E596,680 (Zone 17) Oriskany 7.5' quadrangle. Roadcut, 1.6 miles northwest of Fincastle, on the northeast side of State Road 606, approximately 0.05 mile by road north-northwest of its intersection with State Road 600.

DESCRIPTION: Light to dark olive gray and yellowish-gray to grayish-orange hard shale, which breaks into angular fragments, is present in a long roadcut that has a maximum height of 8 feet. Some purplish-black stain is present along fractures in the shale. The shale has a strike of N57°E and a dip of 75°SE.

FORMATION OR AGE: Martinsburg Formation

SAMPLED INTERVAL: Representative composite sample across 150 feet of shale.

RAW PROPERTIES:

Working properties:	plastic
Water of plasticity:	21.6%
Drying shrinkage:	5.0%
Dry strength:	good
pH:	7.6

SLOW FIRING TEST:

Temp. °C	*Color*	*Hard-ness*	*%Lin. Shk.*	*% Abs.*	*% Appr. Por.*	*Bulk Dens. gm/cc*
1000	Moderate orange	3	5.0	15.7	29.5	1.88
1050	Moderate orange	4	7.5	11.8	23.7	2.01
1100	Strong brown	5	10.0	3.5	8.1	2.30
1150	Moderate reddish-brown	7	10.0	2.2	5.1	2.31
1200	—	—	Expanded	—	—	—
1250	—	—	—	—	—	—

Remarks: Short firing range (1100°-1150°C); no effervescence with HCl.

PRELIMINARY BLOATING TEST: Positive

BLOATING TEST:

Temp. °C	*Percent Absorption*	*Bulk Dens. gm/cc (lb/ft ^{3})*	*Remarks*
1000	8.0	1.74 (108.3)	No expansion
1050	4.9	1.72 (107.5)	No expansion
1100	7.2	1.59 (99.2)	Slight expansion
1150	2.9	0.71 (44.2)	Some large pores

POTENTIAL USE: Structural clay products (e.g., building brick at 1050°-1150°C). Marginal for lightweight aggregate.

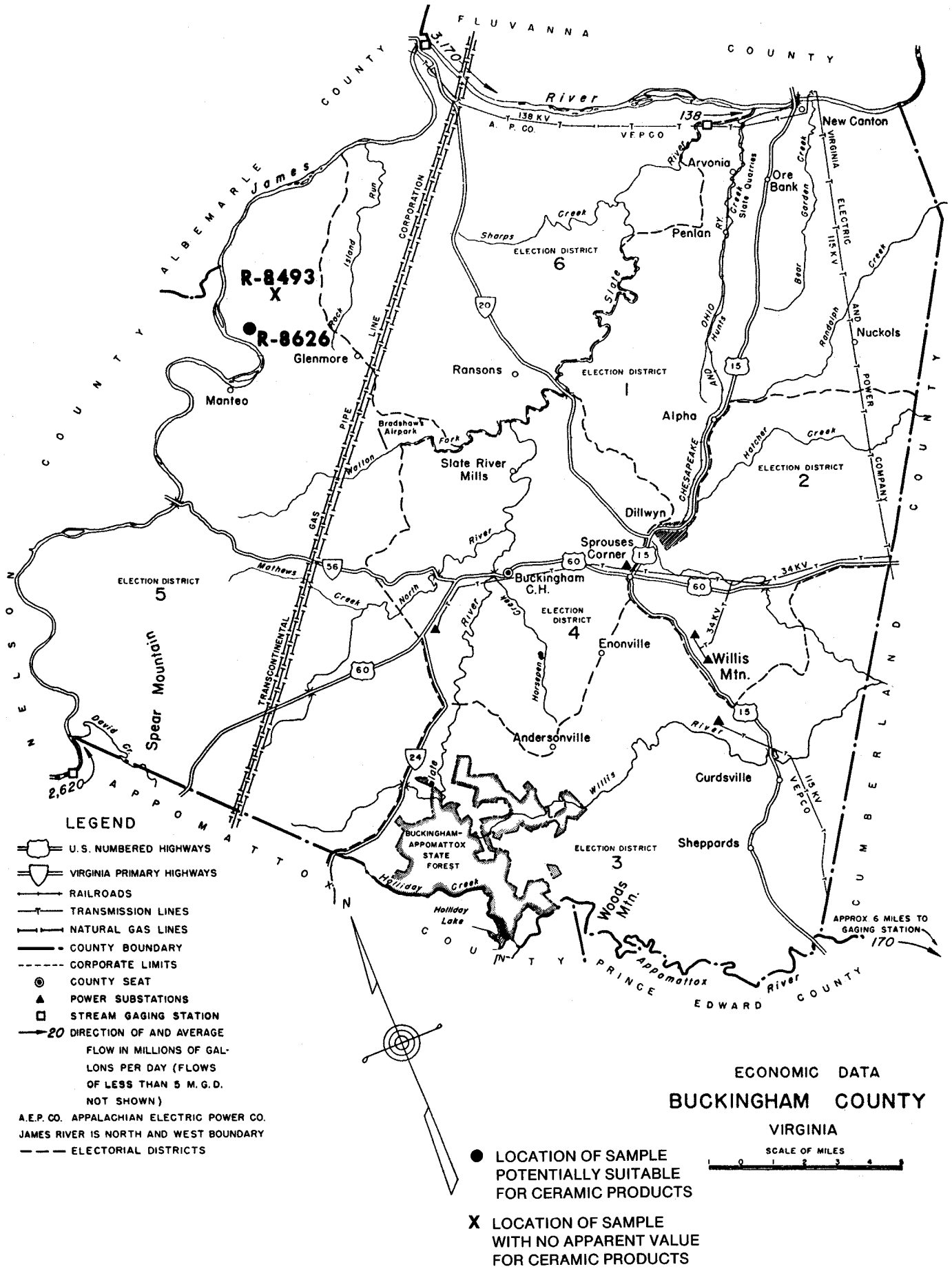

FLUVANNA COUNTY
ALBEMARLE COUNTY
NELSON COUNTY
CUMBERLAND COUNTY
PRINCE EDWARD COUNTY
James River
3,170
138 KV
A. P. CO.
VEPCO
138
New Canton
Arvonia
Ore Bank
Penlan
Slate Creek Quarries
Sharps Creek
ELECTION DISTRICT 6
R-8493
R-8626
Glenmore
Manteo
Rock Island Run
CORPORATION LINE
PIPE
Nelson
Bradshaw's Airport
Ransons
ELECTION DISTRICT 1
Slate
OHIO AND HUNTS RY.
Alpha
Nuckols
Randolph
Bear Garden Creek
VIRGINIA ELECTRIC AND POWER COMPANY 115 KV
Hatcher Creek
ELECTION DISTRICT 2
Slate River Mills
Fork
GAS
CHESAPEAKE
Dillwyn
Sprouses Corner
Buckingham C.H.
34 KV
Mathews Creek
North River
ELECTION DISTRICT 5
Spear Mountain
TRANSCONTINENTAL
ELECTION DISTRICT 4
Enonville
Willis Mtn.
Horsepen Creek
Andersonville
David Cr.
2,620
APPOMATTOX
Slate
Willis River
Curdsville
115 KV VEPCO
BUCKINGHAM-APPOMATTOX STATE FOREST
ELECTION DISTRICT 3
Sheppards
Holliday Creek
Holliday Lake
Woods Mtn.
Appomattox River
APPROX 6 MILES TO GAGING STATION
170
LEGEND
U.S. NUMBERED HIGHWAYS
VIRGINIA PRIMARY HIGHWAYS
RAILROADS
TRANSMISSION LINES
NATURAL GAS LINES
COUNTY BOUNDARY
CORPORATE LIMITS
COUNTY SEAT
POWER SUBSTATIONS
STREAM GAGING STATION
20 DIRECTION OF AND AVERAGE FLOW IN MILLIONS OF GALLONS PER DAY (FLOWS OF LESS THAN 5 M.G.D. NOT SHOWN)
A.E.P. CO. APPALACHIAN ELECTRIC POWER CO.
JAMES RIVER IS NORTH AND WEST BOUNDARY
ELECTORIAL DISTRICTS
ECONOMIC DATA
BUCKINGHAM COUNTY
VIRGINIA
SCALE OF MILES
0 1 2 3 4 5
LOCATION OF SAMPLE POTENTIALLY SUITABLE FOR CERAMIC PRODUCTS
X LOCATION OF SAMPLE WITH NO APPARENT VALUE FOR CERAMIC PRODUCTS

Figure 6.

SAMPLE: R-8493 COUNTY: Buckingham

DATE: October, 1981 — Tuscaloosa Research Center

LOCALITY: Glenmore and Howardsville 7.5' quadrangles. Terrace deposits about 3.7 miles northwest of Glenmore, off both sides of State Road 602.

DESCRIPTION: Pale to moderate reddish-brown silty clay, with some grayish-orange concretion mottlings, is present in terrace deposits. Approximately 1 foot of tan overburden is present. The total amount of clay material is estimated to be 447,000 cu. yds.

FORMATION OR AGE: Pleistocene terrace deposit.

SAMPLED INTERVAL: Composite of clay from six hand-augered holes through average clay thickness of approximately 9 feet.

RAW PROPERTIES:

Working properties:	plastic
Water of plasticity:	30.1%
Drying shrinkage:	5.0%
Dry strength:	good
pH:	4.0

SLOW FIRING TEST:

Temp. °C	*Color*	*Hard-ness*	*%Lin. Shk.*	*% Abs.*	*% Appr. Por.*	*Bulk Dens. gm/cc*
1000	Brownish-orange	2	7.5	24.7	40.9	1.66
1050	Brownish-orange	3	7.5	22.9	39.2	1.71
1100	Brownish-orange	3	10.0	17.9	33.5	1.87
1150	Brownish-orange	3	10.0	17.2	32.6	1.90
1200	Grayish-reddish-brown	3	10.0	16.6	31.8	1.91
1250	Strong brown	3	10.0	16.4	31.5	1.92

Remarks: Too soft; no effervescence with HCl.

PRELIMINARY BLOATING TEST: Negative

POTENTIAL USE: Not suitable for structural clay products.

SAMPLE: R-8626 COUNTY: Buckingham

DATE: July, 1983 — Tuscaloosa Research Center

LOCALITY: N4,175,290 E707,180 (Zone 17) Howardsville 7.5' quadrangle. Roadcut, 3.8 miles northwest of Glenmore on the east side, of a forest road, approximately 2.0 mile by road southeast of its intersection with State Road 602.

DESCRIPTION: Moderate red and pale to dark reddish-brown soft shale is present in a long roadcut that has a maximum height of 8 feet. This Triassic shale has an east-west strike with a dip of 35-65°N. North-south joints are present in the shale; some black stain is present on these joints. The material is more plastic towards the top of the roadcut, and sandy and silty towards the base.

FORMATION OR AGE: Triassic

SAMPLED INTERVAL: Representative sample across 50+ feet of shale.

RAW PROPERTIES:

Working properties:	plastic
Water of plasticity:	26.2%
Drying shrinkage:	2.5%
Dry strength:	good
pH:	5.5

SLOW FIRING TEST:

Temp. °C	*Color*	*Hard-ness*	*%Lin. Shk.*	*% Abs.*	*% Appr. Por.*	*Bulk Dens. gm/cc*
1000	Moderate orange	3	2.5	24.7	41.3	1.67
1050	Moderate orange	3	2.5	22.4	39.0	1.74
1100	Strong brown	4	7.5	16.7	32.1	1.92
1150	Grayish-reddish-orange	4	7.5	14.8	29.4	1.99
1200	Strong brown	5	10.0	10.7	22.6	2.11
1250	Moderate reddish-brown	5	10.0	7.7	16.8	2.19

Remarks: Good firing range; no effervescence with HCl.

PRELIMINARY BLOATING TEST: Negative

POTENTIAL USE: Structural clay products (e.g., building brick at 1100°-1250°C).

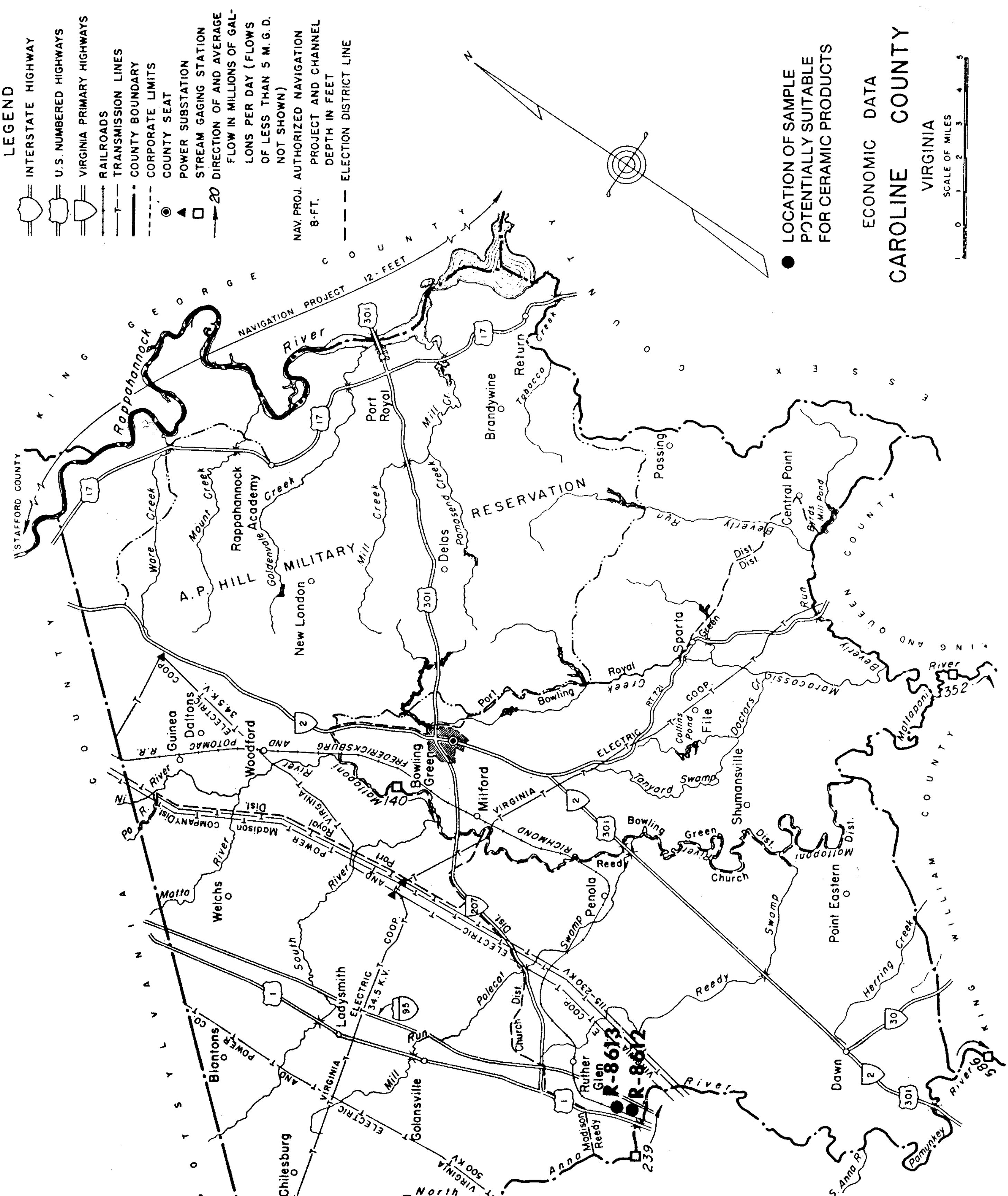

LEGEND
INTERSTATE HIGHWAY
U.S. NUMBERED HIGHWAYS
VIRGINIA PRIMARY HIGHWAYS
RAILROADS
TRANSMISSION LINES
COUNTY BOUNDARY
CORPORATE LIMITS
COUNTY SEAT
POWER SUBSTATION
STREAM GAGING STATION
DIRECTION OF AND AVERAGE FLOW IN MILLIONS OF GALLONS PER DAY (FLOWS OF LESS THAN 5 M. G. D. NOT SHOWN)
NAV. PROJ. 8-FT. AUTHORIZED NAVIGATION PROJECT AND CHANNEL DEPTH IN FEET
ELECTION DISTRICT LINE
LOCATION OF SAMPLE POTENTIALLY SUITABLE FOR CERAMIC PRODUCTS
ECONOMIC DATA
CAROLINE COUNTY
VIRGINIA
SCALE OF MILES
R-8613
R-8612
A. P. HILL MILITARY RESERVATION
Bowling Green
Port Royal
Milford
Ladysmith
Ruther Glen
Woodford
Guinea
Penola
Dawn
Sparta
KING GEORGE COUNTY
ESSEX COUNTY
SPOTSYLVANIA COUNTY
HANOVER COUNTY
KING AND QUEEN COUNTY
KING WILLIAM COUNTY
STAFFORD COUNTY
Rappahannock River
NAVIGATION PROJECT 12-FEET

Figure 7.

SAMPLE: R-8612 COUNTY: Caroline

DATE: March, 1983 — Tuscaloosa Research Center

LOCALITY: N4,196,270 E283,260 (Zone 18) Ruther Glen 7.5' quadrangle. Railroad cut, 2.1 miles southwest of Ruther Glen, on the east side of the Richmond, Fredericksburg and Potomac Railroad, 0.75 mile by railroad north of its crossing over the North Anna River.

DESCRIPTION: Very light gray and grayish-orange to dark yellowish-orange plastic clay, with moderate red to moderate reddish-brown plastic clay mottlings, is present in the middle 4 feet of a long roadcut that has a maximum height of 11 feet. Four feet of yellowish-brown sandy material is present as overburden. The lower 3 additional feet consists of very light gray to dark yellowish-orange plastic to sandy clay.

FORMATION OR AGE: Chesapeake Group

SAMPLED INTERVAL: Representative channel sample across 7 feet of clay.

RAW PROPERTIES:

Working properties:	plastic
Water of plasticity:	29.3%
Drying shrinkage:	2.5%
Dry strength:	good
pH:	4.3

SLOW FIRING TEST:

Temp. °C	*Color*	*Hard-ness*	*%Lin. Shk.*	*% Abs.*	*% Appr. Por.*	*Bulk Dens. gm/cc*
1000	Moderate orange	3	5.0	23.7	39.1	1.65
1050	Moderate orange	3	5.0	22.9	38.2	1.67
1100	Moderate orange	3	7.5	20.0	35.1	1.75
1150	Moderate orange	3	10.0	17.4	31.8	1.83
1200	Brownish-orange	4	10.0	14.7	28.1	1.92
1250	Grayish-reddish-orange	4	10.0	11.5	23.1	2.01

Remarks: No effervescence with HCl.

PRELIMINARY BLOATING TEST: Negative

POTENTIAL USE: Structural clay products (e.g., building brick at 1200°-1250°C).

SAMPLE: R-8613 COUNTY: Caroline

DATE: March, 1983 — Tuscaloosa Research Center

LOCALITY: N4,197,330 E283,240 (Zone 18) Ruther Glen 7.5' quadrangle. Railroad cut, 2.1 miles southwest of Ruther Glen, on the east side of the Richmond, Fredericksburg and Potomac Railroad, 0.8 mile by railroad north of its crossing over the North Anna River.

DESCRIPTION: Light olive gray to grayish-olive, diatomaceous clay that has an exposed thickness of 8 feet is present in a long railroad cut. Surface weathering of the clay to a yellowish-gray and dull yellow color causes a variegated appearance.

FORMATION OR AGE: Chesapeake Group

SAMPLED INTERVAL: Representative channel sample across 5 feet of clay.

RAW PROPERTIES:

Working properties:	plastic
Water of plasticity:	31.4%
Drying shrinkage:	5.0%
Dry strength:	good
pH:	2.9

SLOW FIRING TEST:

Temp. °C	*Color*	*Hard-ness*	*%Lin. Shk.*	*% Abs.*	*% Appr. Por.*	*Bulk Dens. gm/cc*
1000	Moderate orange	3	7.5	41.1	51.4	1.25
1050	Strong orange	3	10.0	31.9	45.2	1.42
1100	Grayish-reddish orange	4	15.0	20.5	34.8	1.70
1150	Strong brown	5	20.0	4.8	11.7	2.44
1200	—	—	Expanded	—	—	—
1250	—	—	—	—	—	—

Remarks: High shrinkage at maturity; no effervescence with HCl.

PRELIMINARY BLOATING TEST: Positive

BLOATING TEST:

Temp. °C	*Percent Absorption*	*Bulk Dens. gm/cc (lb/ft ^{3})*	*Remarks*
1050	21.9	1.36 (84.9)	Slight expansion
1100	32.8	1.28 (79.9)	Slight expansion
1150	9.9	1.17 (73.3)	Partial expansion
1200	9.4	0.73 (45.3)	Some large pores

POTENTIAL USE: Not suitable for structural clay products, marginal for lightweight aggregate (1200°C).

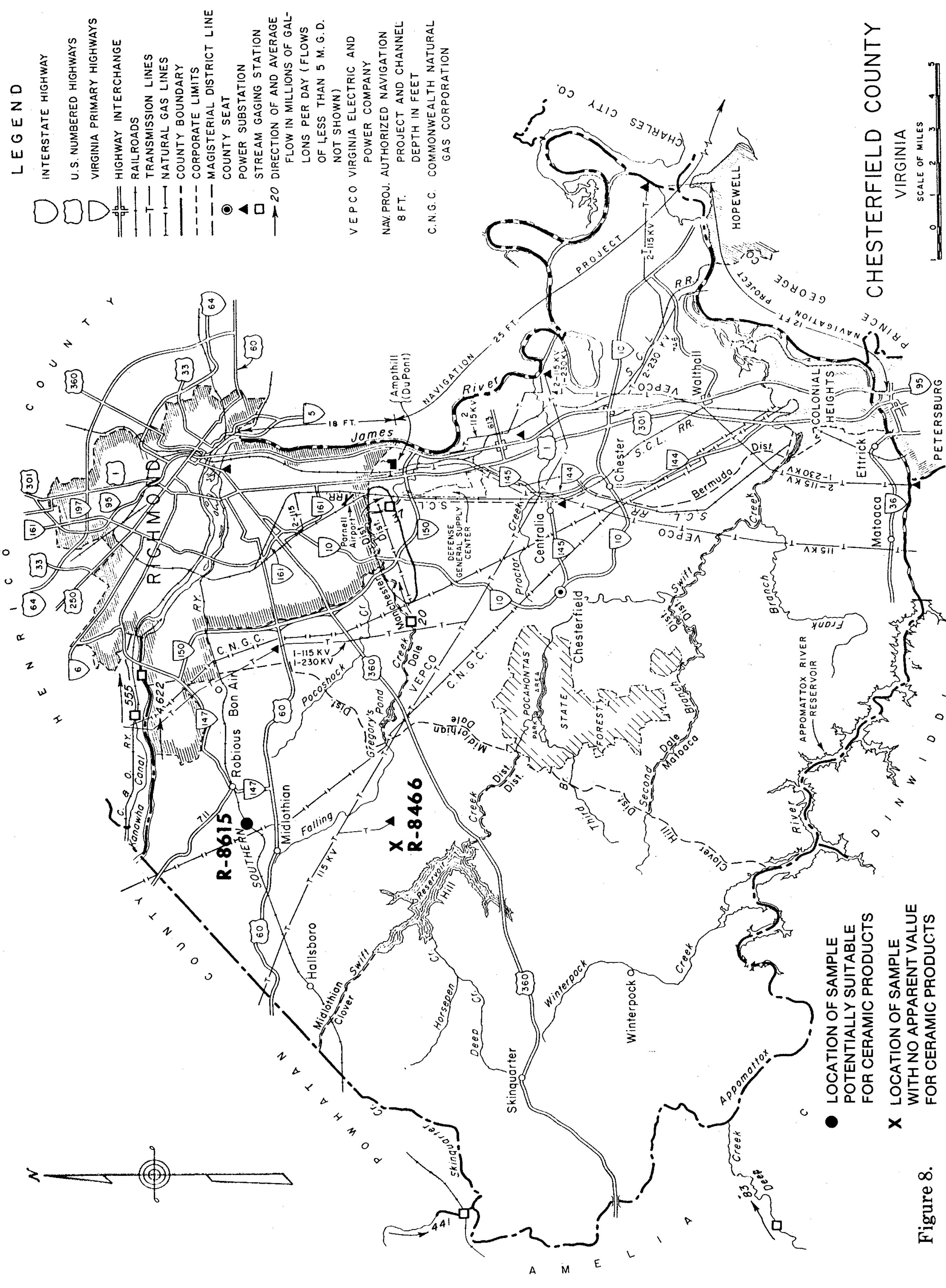

LEGEND
INTERSTATE HIGHWAY
U.S. NUMBERED HIGHWAYS
VIRGINIA PRIMARY HIGHWAYS
HIGHWAY INTERCHANGE
RAILROADS
TRANSMISSION LINES
NATURAL GAS LINES
COUNTY BOUNDARY
CORPORATE LIMITS
MAGISTERIAL DISTRICT LINE
COUNTY SEAT
POWER SUBSTATION
STREAM GAGING STATION
20 DIRECTION OF AND AVERAGE FLOW IN MILLIONS OF GALLONS PER DAY (FLOWS OF LESS THAN 5 M.G.D. NOT SHOWN)
VEPCO VIRGINIA ELECTRIC AND POWER COMPANY
NAV. PROJ. 8 FT. AUTHORIZED NAVIGATION PROJECT AND CHANNEL DEPTH IN FEET
C.N.G.C. COMMONWEALTH NATURAL GAS CORPORATION
CHESTERFIELD COUNTY
VIRGINIA
SCALE OF MILES
● LOCATION OF SAMPLE POTENTIALLY SUITABLE FOR CERAMIC PRODUCTS
X LOCATION OF SAMPLE WITH NO APPARENT VALUE FOR CERAMIC PRODUCTS
R-8615
R-8466
HENRICO COUNTY
POWHATAN CO.
AMELIA CO.
DINWIDDIE COUNTY
CHARLES CITY CO.
PRINCE GEORGE CO.
RICHMOND
HOPEWELL
COLONIAL HEIGHTS
PETERSBURG
Chester
Centralia
Chesterfield
Midlothian
Bon Air
Robious
Hallsboro
Skinquarter
Winterpock
Matoaca
Ettrick
Walthall
James River
Appomattox River
APPOMATTOX RIVER RESERVOIR
Swift Creek Reservoir
POCAHONTAS STATE PARK
POCAHONTAS STATE FOREST
DEFENSE GENERAL SUPPLY CENTER
Ampthill (DuPont)
NAVIGATION 25 FT. PROJECT
NAVIGATION 12 FT. PROJECT

Figure 8.

SAMPLE: R-8466 COUNTY: Chesterfield

DATE: October, 1981 — Tuscaloosa Research Center

LOCALITY: N4,148,020 E266,160 (Zone 18) Hallsboro 7.5' quadrangle. Ditchcut, 3.7 miles south of Midlothian on the south side of a new road approximately 0.1 mile northwest of the intersection of State roads 754 and 604.

DESCRIPTION: Light gray, yellowish-gray, and pale yellowish-orange to grayish-orange sandy clay is present in a 15-foot-long ditchcut that has a maximum height of 4 feet.

FORMATION OR AGE: Residual clay

SAMPLED INTERVAL: Representative channel sample across 4 feet of clay

RAW PROPERTIES:

Working properties:	plastic
Water of plasticity:	20.0%
Drying shrinkage:	5.0%
Dry strength:	good
pH:	4.9

SLOW FIRING TEST:

Temp. °C	*Color*	*Hard-ness*	*%Lin. Shk.*	*% Abs.*	*% Appr. Por.*	*Bulk Dens. gm/cc*
1000	Moderate orange	3	5.0	17.4	31.8	1.82
1050	Moderate orange	3	5.0	17.1	31.2	1.83
1100	Strong orange	3	5.0	16.1	29.9	1.86
1150	Strong orange	3	5.0	16.1	29.8	1.85
1200	Moderate orange	3	5.0	15.9	29.5	1.85
1250	Moderate orange	3	5.0	15.7	29.1	1.85

Remarks: Too soft; no effervescence with HCl.

PRELIMINARY BLOATING TEST: Negative

POTENTIAL USE: Not suitable for structural clay products.

SAMPLE: R-8615 COUNTY: Chesterfield

DATE: March, 1983 — Tuscaloosa Research Center

LOCALITY: N4,155,430 E267,670 (Zone 18) Midlothian 7.5' quadrangle. Stream cut, 1.5 miles northeast of Midlothian, off the northwest side of the Southern Railway System and east of Blackheath Pond.

DESCRIPTION: Dark yellowish-brown and brownish and olive gray plastic clay is present in a streamcut under 6-8 inches of coal and above a silty red-brown shale unit. Dark yellowish-orange stain is present on the soft shale and clay. Some rootlets are also present.

FORMATION OR AGE: Residuum over Triassic sediments.

SAMPLED INTERVAL: Representative sample across 2 feet of clay.

RAW PROPERTIES:

Working properties:	plastic
Water of plasticity:	31.7%
Drying shrinkage:	2.5%
Dry strength:	good
pH:	4.6

SLOW FIRING TEST:

Temp. °C	*Color*	*Hard-ness*	*%Lin. Shk.*	*% Abs.*	*% Appr. Por.*	*Bulk Dens. gm/cc*
1000	Light orangish-yellow	2	5.0	39.2	50.9	1.30
1050	Light orangish-yellow	2	5.0	37.4	49.7	1.33
1100	Pale orangish-yellow	3	7.5	32.6	46.2	1.42
1150	Pale orangish-yellow	3	10.0	23.2	38.2	1.64
1200	Pale orangish-yellow	5	12.5	18.0	32.0	1.78
1250	Pale orangish-yellow	5	15.0	14.0	27.1	1.93

Remarks: High shrinkage at 1250°C; no effervescence with HCl.

PRELIMINARY BLOATING TEST: Negative

POTENTIAL USE: Marginal for structural clay products (e.g., building brick at 1200°C).

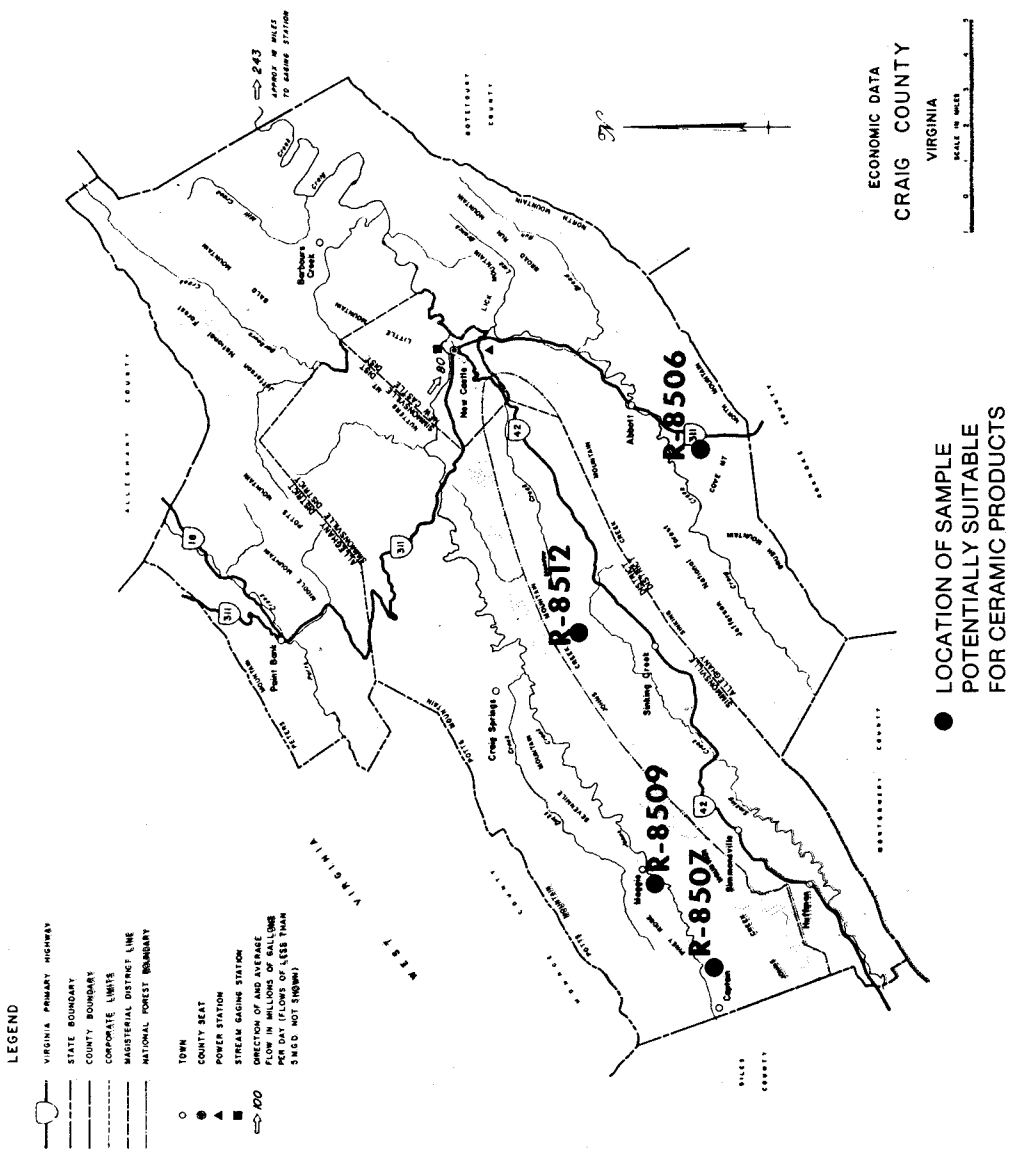

LEGEND
VIRGINIA PRIMARY HIGHWAY
STATE BOUNDARY
COUNTY BOUNDARY
CORPORATE LIMITS
MAGISTERIAL DISTRICT LINE
NATIONAL FOREST BOUNDARY
TOWN
COUNTY SEAT
POWER STATION
STREAM GAGING STATION
DIRECTION OF AND AVERAGE FLOW IN MILLIONS OF GALLONS PER DAY (FLOWS OF LESS THAN 5MGD NOT SHOWN)
⇨ 243 APPROX # MILES TO GAGING STATION
R-8506
R-8512
R-8509
R-8507
LOCATION OF SAMPLE POTENTIALLY SUITABLE FOR CERAMIC PRODUCTS
ECONOMIC DATA
CRAIG COUNTY
VIRGINIA
SCALE IN MILES
VIRGINIA
WEST VIRGINIA

Figure 9.

SAMPLE: R-8506 COUNTY: Craig

DATE: January, 1982 — Tuscaloosa Research Center

LOCALITY: N4,139,560 E574,710 (Zone 17) Looney 7.5' quadrangle. Roadcut, 2.1 miles southwest of Abbott, on the west side of Virginia Highway 311, approximately 0.9 mile by road south of its intersection with State Road 621.

DESCRIPTION: Pale yellowish-brown, grayish-orange, and pale reddish-brown shale is present in a hillside excavation that has a maximum height of 9 feet. Some dark yellowish-brown stain is present along fractures and along some beds in the shale. The shale was sampled up to the bottom of a 6-inch sandstone; additional shale is present above this sandstone. The shale has a strike of N52°E and a dip of 53°SE.

FORMATION OR AGE: Brallier Shale

SAMPLED INTERVAL: Representative composite sample across 60 feet of shale.

RAW PROPERTIES:

Working properties:	short
Water of plasticity:	18.5%
Drying shrinkage:	2.5%
Dry strength:	fair
pH:	7.2

SLOW FIRING TEST:

Temp. °C	*Color*	*Hard-ness*	*%Lin. Shk.*	*% Abs.*	*% Appr. Por.*	*Bulk Dens. gm/cc*
1000	Moderate orange	3	2.5	18.3	33.3	1.82
1050	Moderate orange	4	5.0	14.2	27.6	1.94
1100	Grayish-reddish-orange	5	7.5	9.7	20.4	2.11
1150	Light reddish-brown	6	10.0	5.0	11.5	2.29
1200	—	—	Melted	—	—	—
1250	—	—	—	—	—	—

Remarks: No effervescence with HCl.

PRELIMINARY BLOATING TEST: Negative

POTENTIAL USE: Structural clay products (e.g., building brick at 1050°-1150°C).

SAMPLE: R-8507 COUNTY: Craig

DATE: January, 1982 — Tuscaloosa Research Center

LOCALITY: N4,138,930 E550,320 (Zone 17) Waiteville 7.5' quadrangle. Roadcut 3.3 miles southwest of Maggie on the south side of State Road 632, approximate 1.3 miles by road northeast of its intersection with State Road 601.

DESCRIPTION: Yellowish-gray and light olive-gray to grayish-orange shale and mudstone are present in a long roadcut that has a maximum height of 9 feet. The shale has a strike of N62°E and a dip of 51°NW.

FORMATION OR AGE: Brallier Shale

SAMPLED INTERVAL: Representative composite sample across 25 feet of shale and mudstone.

RAW PROPERTIES:

Working properties:	plastic
Water of plasticity:	23.0%
Drying shrinkage:	2.5%
Dry strength:	good
pH:	6.6

SLOW FIRING TEST:

Temp. °C	*Color*	*Hard-ness*	*%Lin. Shk.*	*% Abs.*	*% Appr. Por.*	*Bulk Dens. gm/cc*
1000	Moderate orange	3	2.5	21.8	37.3	1.71
1050	Moderate orange	3	5.0	18.3	33.2	1.81
1100	Deep orange	4	7.5	11.1	22.7	2.05
1150	Grayish-reddish-orange	5	10.0	5.8	13.2	2.28
1200	Grayish-reddish-orange	6	12.5	2.7	6.3	2.37
1250	Light reddish-brown	6	12.5	1.9	4.5	2.39

Remarks: Slightly high shrinkage at 1200°-1250°; no effervescence with HCl.

PRELIMINARY BLOATING TEST: Negative

POTENTIAL USE: Structural clay products (e.g., building brick at 1100°-1250°C).

SAMPLE: R-8509 COUNTY: Craig

DATE: January, 1982 — Tuscaloosa Research Center

LOCALITY: N4,141,100 E554,080 (Zone 17) Waiteville 7.5' quadrangle. Roadcut 0.6 mile southwest of Maggie, on the northwest side of State Road 632, approximately 0.1 mile by road northeast of its intersection with State Road 658.

DESCRIPTION: Medium to dark gray shale is present in a long roadcut that has a maximum height of 10 feet; the shale weathers into angular fragments and to a very pale orange to grayish-orange color. The shale has a strike of N60°E and a dip of 36°NW; one prominent joint plane is stained rusty brown by iron oxide, and has a strike of N55°W and a vertical dip.

FORMATION OR AGE: Millboro Shale

SAMPLED INTERVAL: Representative sample across 8 feet of shale.

RAW PROPERTIES:

Working properties:	short
Water of plasticity:	18.2%
Drying shrinkage:	2.5%
Dry strength:	fair
pH:	6.9

SLOW FIRING TEST:

Temp. °C	*Color*	*Hard-ness*	*%Lin. Shk.*	*% Abs.*	*% Appr. Por.*	*Bulk Dens. gm/cc*
1000	Pale orangish-yellow	3	2.5	19.0	33.3	1.76
1050	Moderate orangish-yellow	4	5.0	15.2	28.2	1.85
1100	Moderate orange	5	7.5	9.3	18.9	2.03
1150	Brownish-orange	6	7.5	5.9	12.7	2.11
1200	Moderate brown	6	7.5	4.5	9.4	2.14
1250	—	—	Melted	—	—	—

Remarks: Good firing range; no effervescence with HCl.

PRELIMINARY BLOATING TEST: Negative

POTENTIAL USE: Structural clay products (e.g., building brick at 1050°-1200°C).

SAMPLE: R-8512 COUNTY: Craig

DATE: January, 1982 — Tuscaloosa Research Center

LOCALITY: N4,145,320 E566,280 (Zone 17) Craig Springs 7.5' quadrangle. Roadcut, 2.6 miles north-northeast of Sinking Creek, on the north side of State Road 624 approximately 1.2 miles by road northeast of its intersection with State Road 625.

DESCRIPTION: Grayish-brown, pale yellowish-brown, and dark yellowish-orange shale is present in a long roadcut that has a maximum height of 8 feet. Iron oxide stain occurs along bedding and fractures. This shale has a strike of N80°E and a dip of 75°N to vertical.

FORMATION OR AGE: Martinsburg Formation

SAMPLED INTERVAL: Representative composite sample across 5 feet of shale.

RAW PROPERTIES:

Working properties:	plastic
Water of plasticity:	30.9%
Drying shrinkage:	5.0%
Dry strength:	good
pH:	6.2

SLOW FIRING TEST:

Temp. °C	*Color*	*Hard-ness*	*%Lin. Shk.*	*% Abs.*	*% Appr. Por.*	*Bulk Dens. gm/cc*
1000	Strong orange	3	5.0	23.2	38.6	1.66
1050	Moderate orange	4	10.0	17.4	31.8	1.83
1100	Brownish-orange	5	10.0	9.7	20.4	2.09
1150	Strong brown	5	12.5	4.0	9.3	2.30
1200	Moderate reddish-brown	6	15.0	2.9	6.6	2.32
1250	Moderate reddish-brown	6	15.0	2.2	5.0	2.33

Remarks: High shrinkage at 1200°-1250°C; no effervescence with HCl.

PRELIMINARY BLOATING TEST: Negative

POTENTIAL USE: Structural clay products (e.g., building brick at 1050°-1250°C).

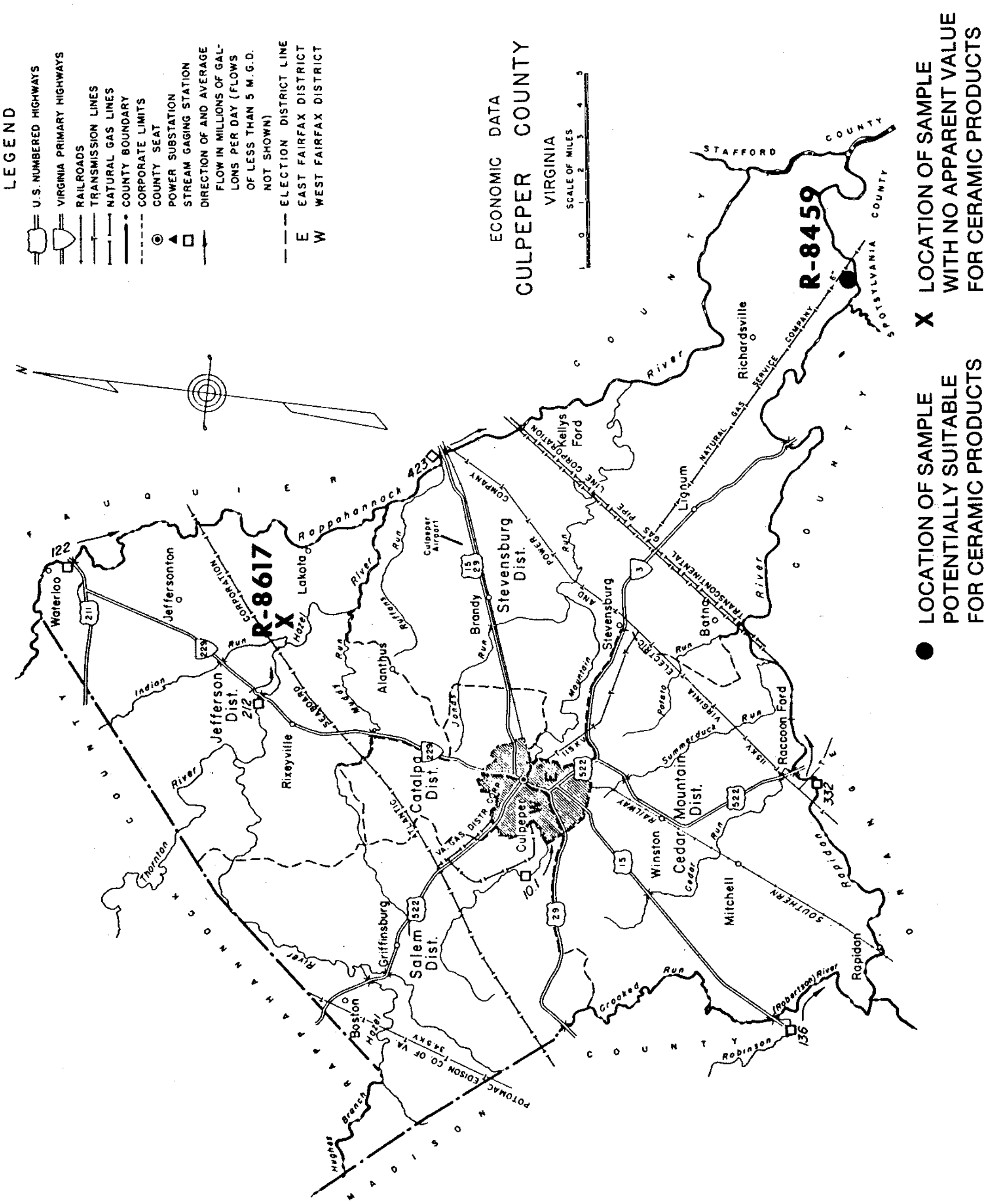

LEGEND
U.S. NUMBERED HIGHWAYS
VIRGINIA PRIMARY HIGHWAYS
RAILROADS
TRANSMISSION LINES
NATURAL GAS LINES
COUNTY BOUNDARY
CORPORATE LIMITS
COUNTY SEAT
POWER SUBSTATION
STREAM GAGING STATION
DIRECTION OF AND AVERAGE FLOW IN MILLIONS OF GALLONS PER DAY (FLOWS OF LESS THAN 5 M.G.D. NOT SHOWN)
ELECTION DISTRICT LINE
E EAST FAIRFAX DISTRICT
W WEST FAIRFAX DISTRICT
ECONOMIC DATA
CULPEPER COUNTY
VIRGINIA
SCALE OF MILES
R-8617
R-8459
Jefferson Dist.
Catalpa Dist.
Salem Dist.
Stevensburg Dist.
Cedar Mountain Dist.
Culpeper
Brandy
Stevensburg
Waterloo
Jeffersonton
Lakota
Alanthus
Rixeyville
Griffinsburg
Boston
Winston
Mitchell
Raccoon Ford
Rapidan
Richardsville
Lignum
Kellys Ford
Rappahannock River
Rapidan River
FAUQUIER
RAPPAHANNOCK COUNTY
MADISON
ORANGE COUNTY
STAFFORD COUNTY
SPOTSYLVANIA COUNTY
● LOCATION OF SAMPLE POTENTIALLY SUITABLE FOR CERAMIC PRODUCTS
X LOCATION OF SAMPLE WITH NO APPARENT VALUE FOR CERAMIC PRODUCTS

Figure 10.

SAMPLE: R-8459 COUNTY: Culpeper

DATE: June, 1981 — Tuscaloosa Research Center

LOCALITY: N4,249,510 E265,250 (Zone 18) Chancellorsville 7.5' quadrangle. Roadcut 0.35 mile north of the Rapidan River on the west side of State Road 610.

DESCRIPTION: Moderate reddish-brown, grayish-orange, and light brown silty to plastic clay is present in a 500-foot-long roadcut that has a maximum height of 8 feet. Some dark yellowish-orange paper-thin schist, which has a strike of N35°E and a vertical dip is present in the base of the ditch towards the northern end of the roadcut; a 1.5-inch-wide quartz vein is present in the schist.

FORMATION OR AGE: Residual clay

SAMPLED INTERVAL: Representative composite channel sample

RAW PROPERTIES:

Working properties:	plastic
Water of plasticity:	29.8%
Drying shrinkage:	7.5%
Dry strength:	good
pH:	4.0

SLOW FIRING TEST:

Temp. °C	*Color*	*Hard-ness*	*%Lin. Shk.*	*% Abs.*	*% Appr. Por.*	*Bulk Dens. gm/cc*
1000	Strong orange	3	7.5	24.7	40.8	1.65
1050	Strong orange	3	7.5	22.6	39.1	1.73
1100	Deep orange	4	10.0	18.8	34.6	1.84
1150	Brownish-orange	4	10.0	17.3	33.0	1.90
1200	Brownish-orange	5	10.0	15.8	30.7	1.95
1250	—	—	Expanded	—	—	—

Remarks: Abrupt vitrification between 1200-1250°C; no effervescence with HCl.

PRELIMINARY BLOATING TEST: Negative

POTENTIAL USE: Structural clay products (e.g., building brick at 1100-1200°C).

SAMPLE: R-8617 COUNTY: Culpeper

DATE: July, 1983 — Tuscaloosa Research Center

LOCALITY: N4,274,880 E246,000 (Zone 18) Brandy Station 7.5' quadrangle. Roadcut, 3.4 miles east of Rixeyville, on the east side of State Road 625 approximately 0.8 mile by road southwest of its intersection with State Road 624.

DESCRIPTION: Dark reddish-orange to moderate reddish-brown plastic clay is present in a maximum height of 6.5 feet. A quartz vein is present towards the southern part of the exposure.

FORMATION OR AGE: Residual clay

SAMPLED INTERVAL: Representative channel sample across 5 feet of clay.

RAW PROPERTIES:

Working properties:	plastic
Water of plasticity:	43.2%
Drying shrinkage:	7.5%
Dry strength:	good
pH:	5.8

SLOW FIRING TEST:

Temp. °C	*Color*	*Hard-ness*	*%Lin. Shk.*	*% Abs.*	*% Appr. Por.*	*Bulk Dens. gm/cc*
1000	Moderate reddish-orange	3	10.0	28.6	46.8	1.64
1050	Moderate reddish-orange	3	12.5	26.0	44.2	1.70
1100	Grayish-reddish-orange	4	15.0	16.2	32.5	2.01
1150	Grayish-reddish-orange	5	17.5	13.0	28.5	2.20
1200	Moderate reddish-brown	5	17.5	10.5	24.4	2.33
1250	Moderate reddish-brown	6	17.5	9.6	22.7	2.36

Remarks: High shrinkage at maturity; no effervescence with HCl.

PRELIMINARY BLOATING TEST: Negative

POTENTIAL USE: Not suitable for structural clay products.

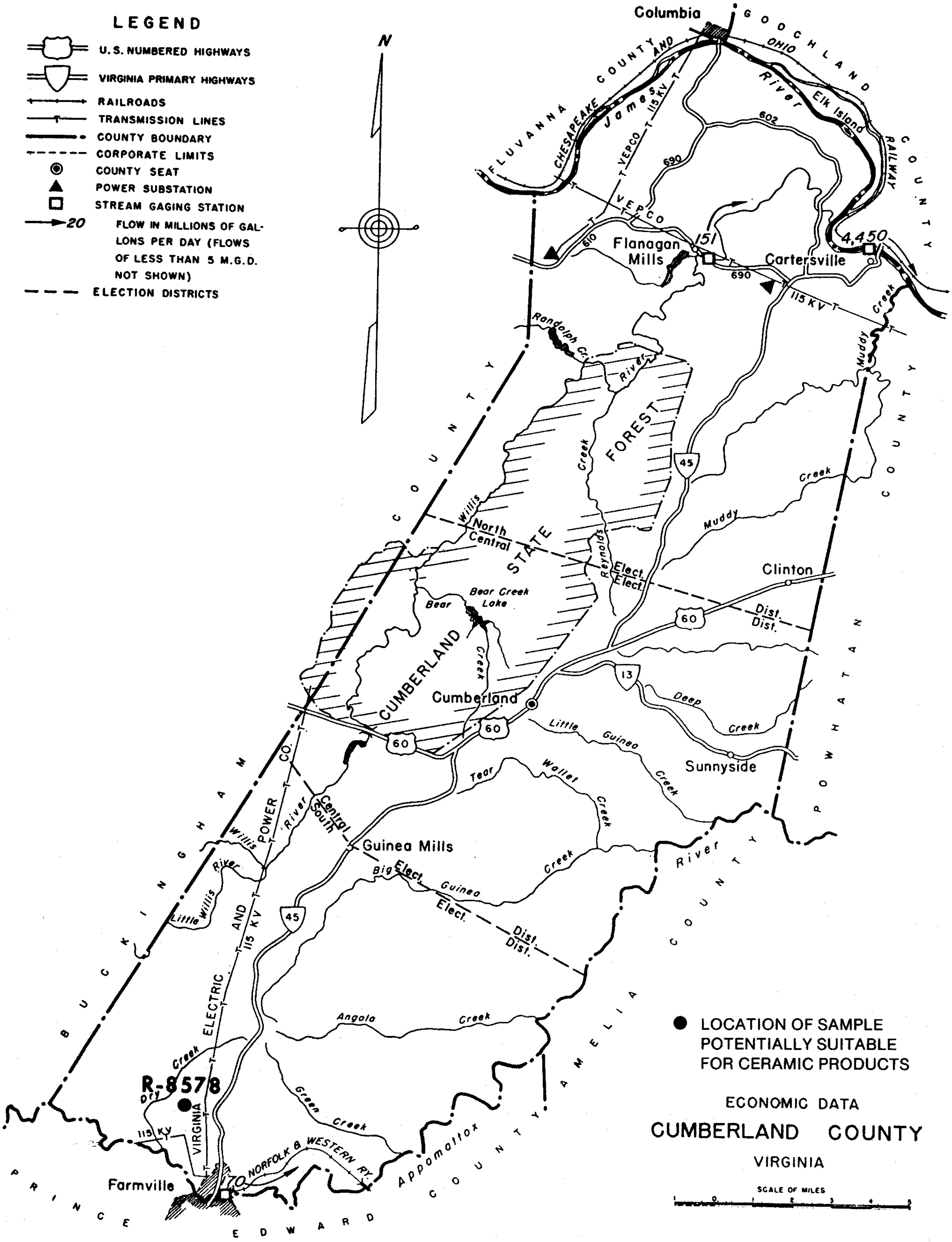

LEGEND
U. S. NUMBERED HIGHWAYS
VIRGINIA PRIMARY HIGHWAYS
RAILROADS
TRANSMISSION LINES
COUNTY BOUNDARY
CORPORATE LIMITS
COUNTY SEAT
POWER SUBSTATION
STREAM GAGING STATION
20 FLOW IN MILLIONS OF GALLONS PER DAY (FLOWS OF LESS THAN 5 M.G.D. NOT SHOWN)
ELECTION DISTRICTS
N
Columbia
GOOCHLAND COUNTY
FLUVANNA COUNTY
Flanagan Mills
Cartersville
Clinton
Cumberland
Sunnyside
Guinea Mills
Farmville
BUCKINGHAM COUNTY
POWHATAN COUNTY
AMELIA COUNTY
APPOMATTOX COUNTY
PRINCE EDWARD
CUMBERLAND STATE FOREST
R-8578
LOCATION OF SAMPLE POTENTIALLY SUITABLE FOR CERAMIC PRODUCTS
ECONOMIC DATA
CUMBERLAND COUNTY
VIRGINIA
SCALE OF MILES

Figure 11.

SAMPLE: R-8578 COUNTY: Cumberland

DATE: January, 1983 — Tuscaloosa Research Center

LOCALITY: N4,135,600 E729,930 (Zone 17) Farmville 7.5' quadrangle. Roadcut, 2.7 miles north of Farmville, on the east side of State Road 600 approximately 0.15 mile by road north of its intersection with State Road 637 at Reeds.

DESCRIPTION: Pinkish-gray to grayish-red, light brown, and pale yellowish-brown to dark yellowish-orange soft shale is present in a long roadcut. The shale interval has a thickness of 10 feet and a strike of N86°E and dip of 8°S. The shale underlies a Triassic siltstone and overlies a 1.5-foot coal.

FORMATION OR AGE: Triassic

SAMPLED INTERVAL: Representative sample across 10 feet of shale.

RAW PROPERTIES:

Working properties:	plastic
Water of plasticity:	34.2%
Drying shrinkage:	5.0%
Dry strength:	good
pH:	4.3

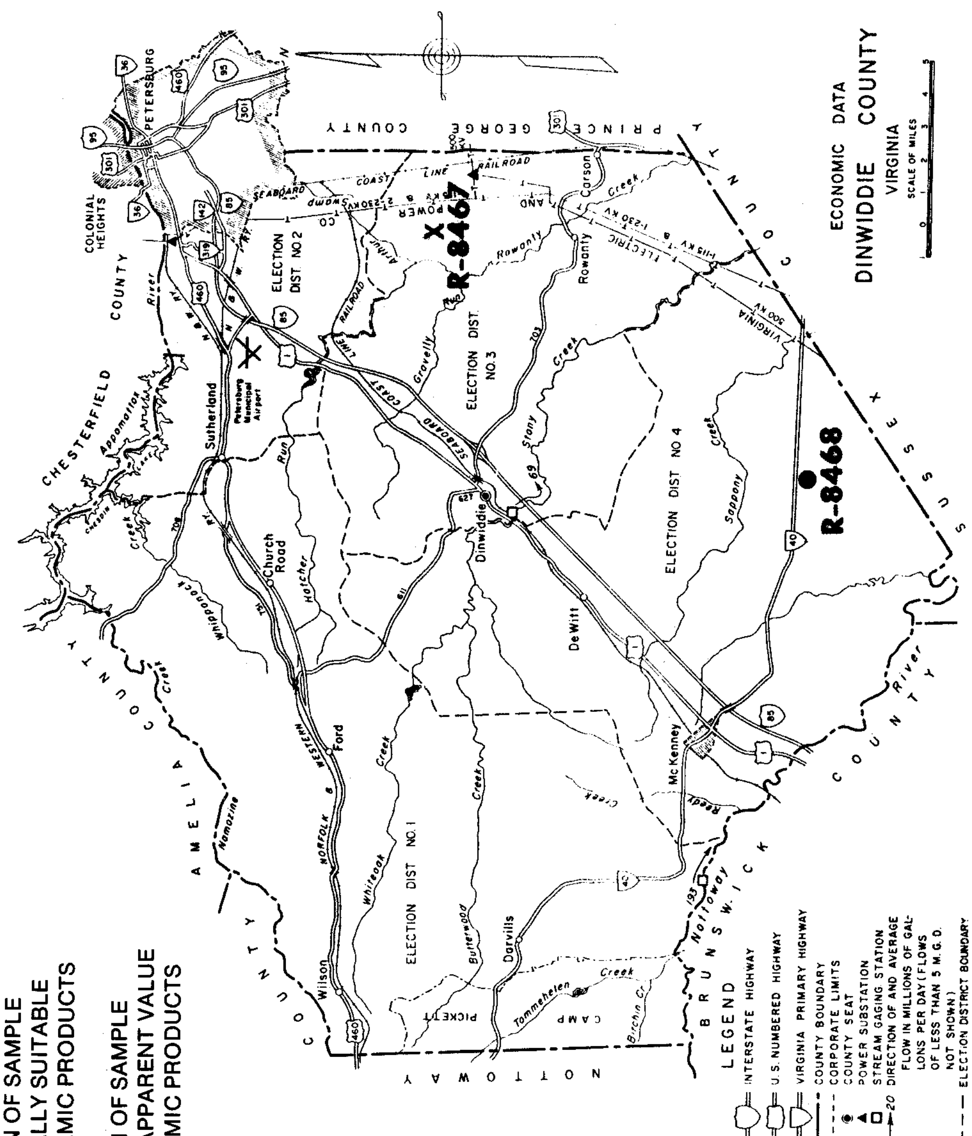
SLOW FIRING TEST:

Temp. °C	*Color*	*Hard-ness*	*%Lin. Shk.*	*% Abs.*	*% Appr. Por.*	*Bulk Dens. gm/cc*
1000	Moderate orange	3	5.0	26.1	41.3	1.58
1050	Moderate orange	3	5.0	22.8	38.3	1.68
1100	Moderate orange	5	10.0	14.5	27.8	1.92
1150	Brownish-orange	5	12.5	7.5	16.1	2.15
1200	Strong brown	6	12.5	3.2	7.4	2.29
1250	Strong brown	6	15.0	2.2	5.1	2.32

Remarks: High shrinkage at 1250°C; slightly high shrinkage at 1150-1200°C; no effervescence with HCl.

PRELIMINARY BLOATING TEST: Negative

POTENTIAL USE: Structural clay products (e.g., building brick at 1100-1200°C).


ECONOMIC DATA
DINWIDDIE COUNTY
VIRGINIA
SCALE OF MILES
R-8467
R-8468
CHESTERFIELD COUNTY
PRINCE GEORGE COUNTY
SUSSEX COUNTY
BRUNSWICK COUNTY
NOTTOWAY
AMELIA COUNTY
ELECTION DIST NO.1
ELECTION DIST NO 2
ELECTION DIST. NO.3
ELECTION DIST NO 4
PETERSBURG
COLONIAL HEIGHTS
Sutherland
Church Road
Dinwiddie
DeWitt
McKenney
Ford
Wilson
Darvills
Rowanty
Carson
LEGEND
INTERSTATE HIGHWAY
U.S. NUMBERED HIGHWAY
VIRGINIA PRIMARY HIGHWAY
COUNTY BOUNDARY
CORPORATE LIMITS
COUNTY SEAT
POWER SUBSTATION
STREAM GAGING STATION
DIRECTION OF AND AVERAGE FLOW IN MILLIONS OF GALLONS PER DAY (FLOWS OF LESS THAN 5 M.G.D. NOT SHOWN)
ELECTION DISTRICT BOUNDARY
RAILROADS
TRANSMISSION LINES

● LOCATION OF SAMPLE POTENTIALLY SUITABLE FOR CERAMIC PRODUCTS

X LOCATION OF SAMPLE WITH NO APPARENT VALUE FOR CERAMIC PRODUCTS

Figure 12.

SAMPLE: R-8467 COUNTY: Dinwiddie

DATE: October, 1981 — Tuscaloosa Research Center

LOCALITY: N4,109,700 E282,900 (Zone 18) Carson 7.5' quadrangle. Roadcut, 5.7 miles northwest of Carson, on the southeast side of State Road 669 approximately 1.2 miles by road west of its intersection with Halifax Road (State Road 604).

DESCRIPTION: Moderate yellowish-brown clay, mottled with dark yellowish-orange to very light gray clay, is present in a 300-foot-long roadcut that has a maximum height of 6.5 feet. Towards the base of the roadcut the plastic clay is predominantly dark red, pinkish-gray and light olive gray. The clay is covered by 4 feet of very sandy red clay with numerous rounded white quartz pebbles.

FORMATION OR AGE: Residual clay.

SAMPLED INTERVAL: Representative channel sample across 4 feet of clay (2.5 feet exposed and 1.5 feet dug at base of roadcut).

RAW PROPERTIES:

Working properties:	plastic
Water of plasticity:	29.3%
Drying shrinkage:	7.5%
Dry strength:	good
pH:	4.3

SLOW FIRING TEST:

Temp. °C	*Color*	*Hard-ness*	*%Lin. Shk.*	*% Abs.*	*% Appr. Por.*	*Bulk Dens. gm/cc*
1000	Moderate orange	3	7.5	21.3	36.5	1.71
1050	Moderate orange	3	7.5	20.6	35.7	1.73
1100	Moderate orange	3	10.0	19.1	34.1	1.79
1150	Moderate orange	3	10.0	16.5	30.5	1.85
1200	Light brown	3	10.0	15.1	28.6	1.90
1250	Light brown	3	10.0	14.9	28.6	1.91

Remarks: Too soft; no effervescence with HCl.

PRELIMINARY BLOATING TEST: Negative

POTENTIAL USE: Not suitable for structural clay products

SAMPLE: R-8468 COUNTY: Dinwiddie

DATE: October, 1981 — Tuscaloosa Research Center

LOCALITY: N4,091,860 E269,540 (Zone 18) Cherry Hill 7.5' quadrangle. Roadcut, 7.5 miles east of McKenny, on the south side of Virginia Highway 40 approximately 0.2 mile by road west of its intersection with State Road 619.

DESCRIPTION: Very pale orange and dark yellowish-brown and cream plastic clay, mottled with pale reddish-brown and light red plastic clay, is present in a 275-foot-long roadcut that has a maximum height of 13 feet. Partly weathered yellowish-brown schist is present at the base of the roadcut. The top 7 feet of the exposure consists of light red and dark yellowish-orange silty and sandy clay with some light gray sand. Some quartz cobbles are present near the base of the clay.

FORMATION OR AGE: Residual clay

SAMPLED INTERVAL: Representative channel sample across the lower 6 feet of the clay.

RAW PROPERTIES:

Working properties:	plastic
Water of plasticity:	32.8%
Drying shrinkage:	5.0%
Dry strength:	good
pH:	4.2

SLOW FIRING TEST:

Temp. °C	*Color*	*Hard-ness*	*%Lin. Shk.*	*% Abs.*	*% Appr. Por.*	*Bulk Dens. gm/cc*
1000	Moderate orange	3	5.0	28.0	43.5	1.56
1050	Moderate orange	3	7.5	27.1	42.7	1.57
1100	Moderate orange	3	7.5	24.5	40.5	1.65
1150	Strong orange	3	7.5	22.5	38.4	1.70
1200	Moderate orange	5	10.0	19.8	35.4	1.79
1250	Moderate orange	5	10.0	18.5	33.5	1.81

Remarks: No effervescence with HCl.

PRELIMINARY BLOATING TEST: Negative

POTENTIAL USE: Structural clay products (e.g., building brick at 1200°-1250°C).

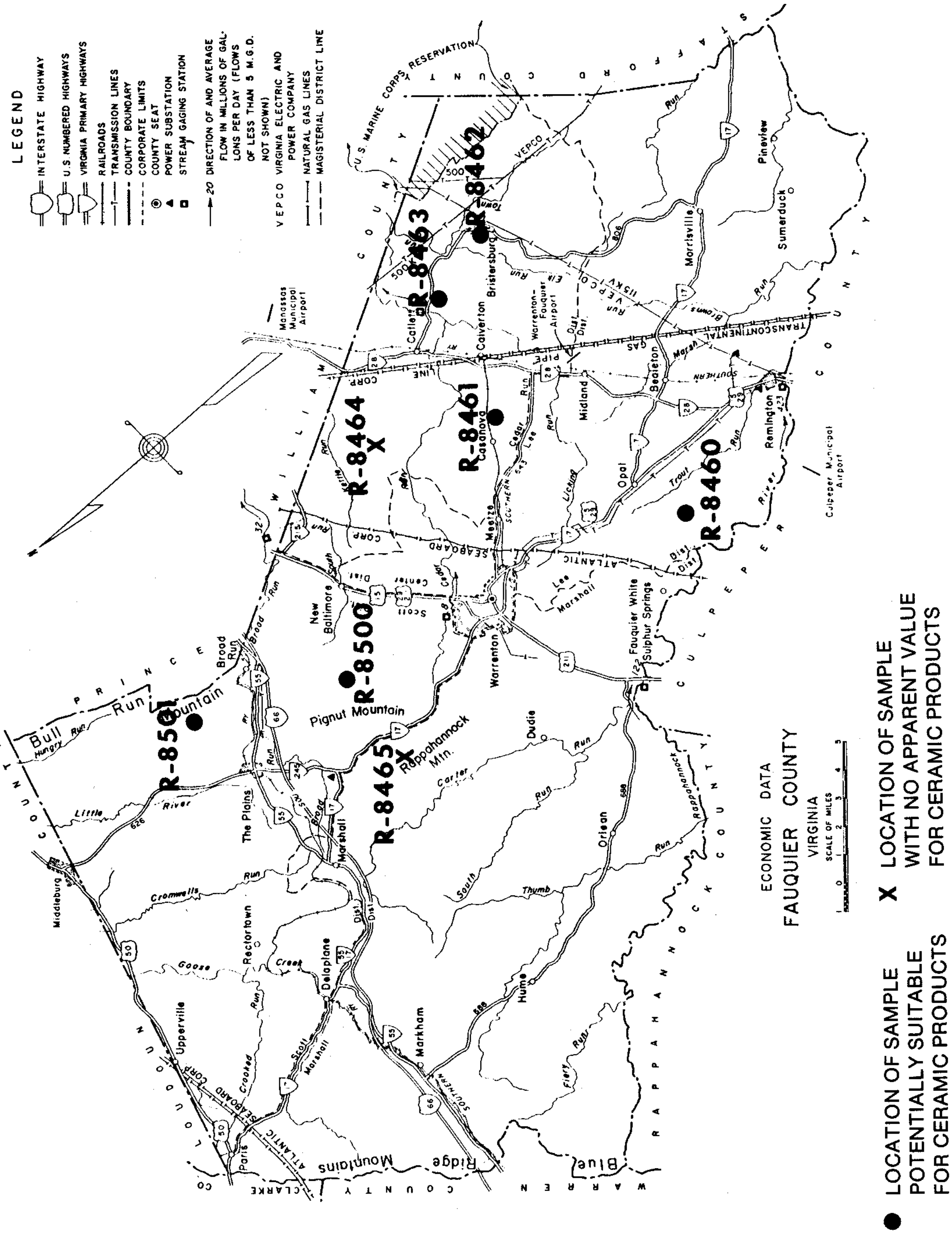

LEGEND
INTERSTATE HIGHWAY
U.S. NUMBERED HIGHWAYS
VIRGINIA PRIMARY HIGHWAYS
RAILROADS
TRANSMISSION LINES
COUNTY BOUNDARY
CORPORATE LIMITS
COUNTY SEAT
POWER SUBSTATION
STREAM GAGING STATION
20 DIRECTION OF AND AVERAGE FLOW IN MILLIONS OF GALLONS PER DAY (FLOWS OF LESS THAN 5 M.G.D. NOT SHOWN)
VEPCO VIRGINIA ELECTRIC AND POWER COMPANY
NATURAL GAS LINES
MAGISTERIAL DISTRICT LINE
ECONOMIC DATA
FAUQUIER COUNTY
VIRGINIA
SCALE OF MILES
R-8501
R-8500
R-8465
R-8464
R-8463
R-8462
R-8461
R-8460
Pignut Mountain
Rappahannock Mtn.
Warrenton
The Plains
Marshall
Markham
Upperville
Paris
Delaplane
Rectortown
Middleburg
New Baltimore
Catlett
Calverton
Bristersburg
Casanova
Midland
Bealeton
Remington
Opal
Morrisville
Sumerduck
Pineview
Orlean
Hume
Fauquier White Sulphur Springs
U.S. MARINE CORPS RESERVATION
LOCATION OF SAMPLE POTENTIALLY SUITABLE FOR CERAMIC PRODUCTS
X LOCATION OF SAMPLE WITH NO APPARENT VALUE FOR CERAMIC PRODUCTS

Figure 13.

SAMPLE: R-8460 COUNTY: Fauquier

DATE: June, 1981 — Tuscaloosa Research Center

LOCALITY: N4,277,600 E253,540 (Zone 18) Remington 7.5' quadrangle. Roadcut, 1.6 miles southwest of Opal, on the east side of State Road 651 approximately 0.25 mile by road south of its intersection with State Road 685.

DESCRIPTION: Moderate reddish-brown plastic clay mottled with light gray plastic clay is present in the top five feet of a 225-foot-long exposure that has a maximum height of 10 feet. The lower 18 inches of this unit contains rounded quartz pebbles and cobbles. The lower 5 feet consists of dark yellowish-orange plastic clay mottled with reddish-brown and light gray plastic clay.

FORMATION OR AGE: Residual clay

SAMPLED INTERVAL: Composite of several channel samples.

RAW PROPERTIES:

Working properties:	plastic
Water of plasticity:	29.2%
Drying shrinkage:	7.5%
Dry strength:	good
pH:	4.0

SLOW FIRING TEST:

Temp. °C	*Color*	*Hard-ness*	*%Lin. Shk.*	*% Abs.*	*% Appr. Por.*	*Bulk Dens. gm/cc*
1000	Deep orange	3	7.5	20.3	37.4	1.84
1050	Brownish-orange	3	10.0	20.5	37.9	1.85
1100	Brownish-orange	4	10.0	18.8	35.8	1.91
1150	Brownish-orange	4	10.0	17.1	33.5	1.95
1200	Brownish-orange	5	10.0	15.9	32.1	2.00
1250	Grayish-reddish-orange	5	10.0	15.7	31.3	2.02

Remarks: No effervescence with HCl.

PRELIMINARY BLOATING TEST: Negative

POTENTIAL USE: Structural clay products (e.g., building brick at 1100°-1250°C).

SAMPLE: R-8461 COUNTY: Fauquier

DATE: June, 1981 — Tuscaloosa Research Center

LOCALITY: N4,281,720 E264,190 (Zone 18) Catlett 7.5' quadrangle. Railroad cut, 2.6 miles northwest of Calverton, on the northeast side of the Southern Railway approximately 1.25 miles northwest of State Road 616 crossing over the railroad tracks.

DESCRIPTION: Pale red to grayish-red shale with some black iron oxide stain along bedding, and residual clay are present in a 600-foot-long railroad cut with a maximum height of 10 feet. The shale strikes along the roadcut (N47°W) and dips 40° southwest. Shale extends 300 feet into the field to the northeast. A small amount of silty reddish-orange overburden is present.

FORMATION OR AGE: Triassic

SAMPLED INTERVAL: Representative composite sample across 30 feet of shale and residual clay along the southwest side of the railroad tracks.

RAW PROPERTIES:

Working properties:	plastic
Water of plasticity:	29.3%
Drying shrinkage:	5.0%
Dry strength:	good
pH:	4.0

SLOW FIRING TEST:

Temp. °C	*Color*	*Hard-ness*	*%Lin. Shk.*	*% Abs.*	*% Appr. Por.*	*Bulk Dens. gm/cc*
1000	Strong orange	3	5.0	23.1	39.1	1.69
1050	Deep orange	4	7.5	18.3	33.7	1.84
1100	Brownish-orange	5	10.0	11.9	24.4	2.06
1150	Strong brown	6	12.5	6.4	14.8	2.31
1200	Strong brown	6	12.5	3.6	8.4	2.37
1250	Moderate reddish-brown	6	15.0	2.0	4.7	2.42

Remarks: High shrinkage at 1000°-1250°C; no effervescence with HCl.

PRELIMINARY BLOATING TEST: Negative

POTENTIAL USE: Structural clay products (e.g., building brick at 1050°-1100°C).

SAMPLE: R-8462 COUNTY: Fauquier

DATE: June, 1981 — Tuscaloosa Research Center

LOCALITY: N4,273,640 E272,660 (Zone 18) Somerville 7.5' quadrangle. Roadcut, 0.6 mile east of Bristersburg, on the north side of State Road 806 at its intersection with State Road 609.

DESCRIPTION: Moderate reddish-brown to dark reddish-brown clay is present in a long grassed-over roadcut that has a maximum height of 4.5 feet. Some fine mica is present in the clay in the western end of the roadcut.

FORMATION OR AGE: Residual clay

SAMPLED INTERVAL: Representative sample of clay from the roadcut.

RAW PROPERTIES:

Working properties:	plastic
Water of plasticity:	26.1%
Drying shrinkage:	7.5%
Dry strength:	good
pH:	4.3

SLOW FIRING TEST:

Temp. °C	*Color*	*Hard-ness*	*%Lin. Shk.*	*% Abs.*	*% Appr. Por.*	*Bulk Dens. gm/cc*
1000	Strong orange	3	7.5	17.2	32.4	1.84
1050	Deep orange	5	10.0	12.1	25.0	2.02
1100	Strong brown	6	15.0	5.2	12.2	2.28
1150	Strong brown	6	15.0	1.7	4.3	2.42
1200	—	—	Melted	—	—	—
1250	—	—	—	—	—	—

Remarks: High shrinkage at 1100°-1150°C; no effervescence with HCl.

PRELIMINARY BLOATING TEST: Negative

POTENTIAL USE: Structural clay products (e.g., building brick at 1050°C).

SAMPLE: R-8463 COUNTY: Fauquier

DATE: June, 1981 — Tuscaloosa Research Center

LOCALITY: N4,278,450 E272,210 (Zone 18) Nokesville 7.5' quadrangle. Roadcut, 2.0 miles southwest of Catlett, on the southwest side of State Road 806 approximately 0.6 mile by road southeast of its intersection with State Road 607 heading northeast.

DESCRIPTION: Yellowish-gray and dark yellowish-brown plastic clay is present in a long roadcut that has a maximum height of 3.5 feet. The clay is silty towards the top of the exposure. Some small pebbles, with iron-oxide coating, are present near the base of the exposure.

FORMATION OR AGE: Transported clay

SAMPLED INTERVAL: Representative sample from the roadcut.

RAW PROPERTIES:

Working properties:	plastic
Water of plasticity:	31.8%
Drying shrinkage:	7.5%
Dry strength:	good
pH:	4.0

SLOW FIRING TEST:

Temp. °C	*Color*	*Hard-ness*	*%Lin. Shk.*	*% Abs.*	*% Appr. Por.*	*Bulk Dens. gm/cc*
1000	Strong brown	3	10.0	13.8	27.7	2.01
1050	Strong brown	4	10.0	10.3	21.8	2.12
1100	Brownish-orange	5	12.5	6.6	14.7	2.24
1150	Strong brown	5	12.5	4.8	11.2	2.34
1200	Grayish-reddish-orange	5	12.5	3.5	8.4	2.39
1250	Strong brown	5	12.5	2.6	6.3	2.44

Remarks: Slightly high shrinkage at 1100°-1250°C; no effervescence with HCl.

PRELIMINARY BLOATING TEST: Negative

POTENTIAL USE: Structural clay products (e.g., building brick at 1050°-1250°C).

SAMPLE: R-8464 COUNTY: Fauquier

DATE: June, 1981 — Tuscaloosa Research Center

LOCALITY: N4,287,550 E266,950 (Zone 18) Catlett 7.5' quadrangle. Roadcut, 4.0 miles north of Catlett on the north side of State Road 605 approximately 0.1 mile by road west of its intersection with Road 1510.

DESCRIPTION: Pale red to grayish-red shale is present in a 150-foot-long roadcut that has a maximum height of 7.5 feet. Black iron oxide stain is present along joints, especially towards the base of the exposure. The shale is at least 50 feet thick as indicated by shale outcrop west along State Road 605. About 1.5 feet of reddish-orange silty overburden with some rounded pebbles is present.

FORMATION OR AGE: Triassic

SAMPLED INTERVAL: Representative channel sample across 6 feet of shale.

RAW PROPERTIES:

Working properties:	plastic
Water of plasticity:	27.9%
Drying shrinkage:	7.5%
Dry strength:	good
pH:	4.1

SLOW FIRING TEST:

Temp. °C	*Color*	*Hard-ness*	*%Lin. Shk.*	*% Abs.*	*% Appr. Por.*	*Bulk Dens. gm/cc*
1000	Strong brown	3	10.0	13.8	26.8	1.94
1050	Deep brown	5	12.5	8.7	18.6	2.15
1100	Strong brown	6	15.0	3.7	8.8	2.42
1150	Strong brown	6	15.0	1.9	4.7	2.45
1200	—	—	Melted	—	—	—
1250	—	—	—	—	—	—

Remarks: High shrinkage; no effervescence with HCl.

PRELIMINARY BLOATING TEST: Negative

POTENTIAL USE: Not suitable for structural clay products.

SAMPLE: R-8465 COUNTY: Fauquier

DATE: June, 1981 — Tuscaloosa Research Center

LOCALITY: N4,298,700 E254,470 (Zone 18) Marshall 7.5' quadrangle. Roadcut, 5.0 miles south of Marshall, on the west side of State Road 699, approximately 0.45 mile by road west of its intersection with U. S. Highway 17.

DESCRIPTION: Moderate and dark reddish-brown clay is present in a 300-foot-long roadcut that has a maximum height of 6 feet. Some light to dark yellowish-orange clay is also present.

FORMATION OR AGE: Residual clay

SAMPLED INTERVAL: Representative clay across 5 feet of the roadcut.

RAW PROPERTIES:

Working properties:	short
Water of plasticity:	41.1%
Drying shrinkage:	7.5%
Dry strength:	fair
pH:	4.3

SLOW FIRING TEST:

Temp. °C	*Color*	*Hard-ness*	*%Lin. Shk.*	*% Abs.*	*% Appr. Por.*	*Bulk Dens. gm/cc*
1000	Brownish-orange	3	10.0	31.9	50.3	1.58
1050	Brownish-orange	3	10.0	29.4	48.5	1.65
1100	Strong brown	3	15.0	24.2	43.3	1.79
1150	Strong brown	3	15.0	21.5	40.6	1.89
1200	Strong brown	4	15.0	19.6	38.3	1.96
1250	Strong brown	4	15.0	19.4	38.1	1.97

Remarks: High shrinkage; no effervescence with HCl.

PRELIMINARY BLOATING TEST: Negative

POTENTIAL USE: Not suitable for structural clay products.

SAMPLE: R-8500 COUNTY: Fauquier

DATE: January, 1982 — Tuscaloosa Research Center

LOCALITY: N4,297,280 E259,370 (Zone 18) Marshall 7.5' quadrangle. Roadcut 3.2 miles west of New Baltimore, on the northwest side of State Road 628 just northeast of its intersection with State Road 694.

DESCRIPTION: Moderate reddish-brown to dark red plastic clay, with some dark yellowish-orange clay and shale mottlings, is present in a 250-foot-long roadcut that has a maximum height of 5 feet. Some pebbles are present in the exposure, which has about 6 inches of light brown, loamy overburden. Some yellowish shale is present in the base of the southwest part of the exposure.

FORMATION OR AGE: Residual clay

SAMPLED INTERVAL: Representative sample of 4.5 feet of clay in the northeast end of the roadcut.

RAW PROPERTIES:

Working properties:	plastic
Water of plasticity:	31.4%
Drying shrinkage:	5.0%
Dry strength:	good
pH:	7.8

SLOW FIRING TEST:

Temp. °C	*Color*	*Hard-ness*	*%Lin. Shk.*	*% Abs.*	*% Appr. Por.*	*Bulk Dens. gm/cc*
1000	Brownish-orange	3	7.5	24.1	41.0	1.70
1050	Brownish-orange	4	10.0	20.3	37.0	1.82
1100	Grayish-reddish orange	5	10.0	16.9	32.8	1.94
1150	Grayish-reddish orange	5	12.5	15.6	31.0	1.99
1200	Moderate reddish-brown	5	12.5	13.5	27.7	2.05
1250	Moderate reddish-brown	5	12.5	12.2	26.0	2.12

Remarks: Good firing range, slightly high shrinkage at 1150°-1250°C; no effervescence with HCl.

PRELIMINARY BLOATING TEST: Negative

POTENTIAL USE: Structural clay products (e.g., building brick at 1050°-1250°C).

SAMPLE: R-8501 COUNTY: Fauquier

DATE: January, 1982 — Tuscaloosa Research Center

LOCALITY: N4,304,180 E263,400 (Zone 18) Thoroughfare Gap 7.5' quadrangle. Roadcut, 2.6 miles east of The Plains, on the west side of State Road 628 approximately 1.25 miles by road south of its intersection with State Road 601.

DESCRIPTION: Moderate to dark reddish-brown plastic clay, with some light brown clay, is present in a 100-foot-long roadcut that has a maximum height of 5 feet. Some yellowish-brown weathered mica schist is present near the base of the roadcut. About 6 inches of light brown loamy overburden is present.

FORMATION OR AGE: Residual clay

SAMPLED INTERVAL: Representative channel sample across 4.5 feet of clay.

RAW PROPERTIES:

Working properties:	plastic
Water of plasticity:	41.0%
Drying shrinkage:	7.5%
Dry strength:	good
pH:	6.8

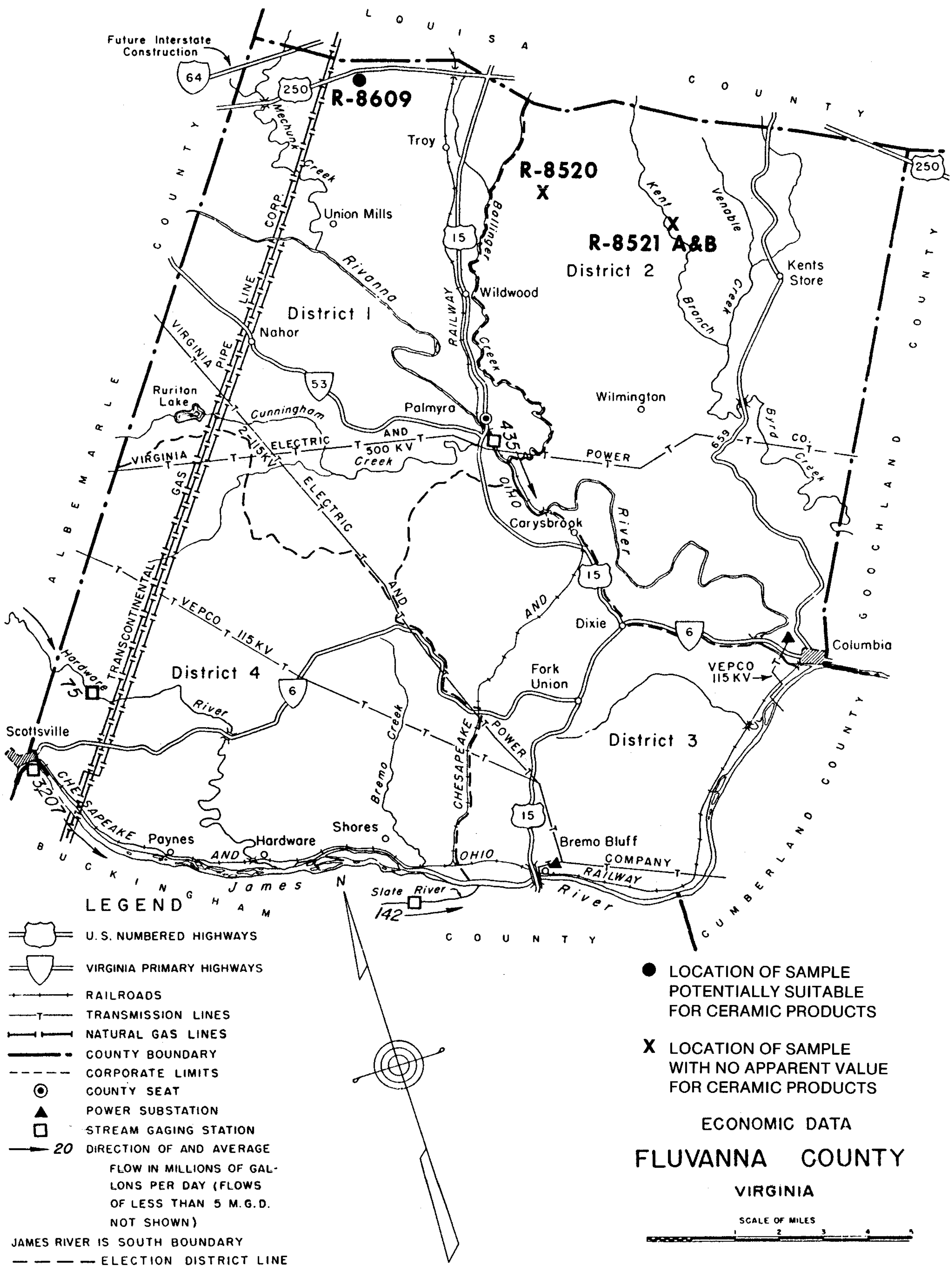
SLOW FIRING TEST:

Temp. °C	*Color*	*Hard-ness*	*%Lin. Shk.*	*% Abs.*	*% Appr. Por.*	*Bulk Dens. gm/cc*
1000	Deep orange	3	10.0	27.4	45.3	1.65
1050	Brownish-orange	3	12.5	23.6	41.8	1.78
1100	Grayish-reddish orange	5	15.0	14.3	30.0	2.10
1150	Grayish-reddish orange	5	17.5	12.7	27.6	2.18
1200	Light reddish-brown	5	17.5	11.8	26.3	2.22
1250	Strong brown	5	17.5	11.3	25.2	2.24

Remarks: High shrinkage; no effervescence with HCl.

PRELIMINARY BLOATING TEST: Negative

POTENTIAL USE: Marginal for structural clay products (e.g., building brick at 1100°-1250°C).



LOUISA COUNTY
ALBEMARLE COUNTY
GOOCHLAND COUNTY
CUMBERLAND COUNTY
BUCKINGHAM COUNTY
Future Interstate Construction
64
250
R-8609
R-8520
X
R-8521 A&B
Troy
Union Mills
Kents Store
District 1
District 2
District 3
District 4
Nahor
Wildwood
Wilmington
Palmyra
Ruriton Lake
Carysbrook
Dixie
Fork Union
Columbia
Scottsville
Paynes
Hardware
Shores
Bremo Bluff
Rivanna
Mechunk Creek
Ballinger Creek
Kent Branch
Venable Creek
Byrd Creek
Cunningham Creek
Hardware River
Bremo Creek
James River
Slate River
CORP. LINE
VIRGINIA PIPE LINE
TRANSCONTINENTAL GAS
VIRGINIA ELECTRIC AND POWER
115 KV
500 KV
VEPCO 115 KV
VEPCO 115 KV
RAILWAY
CHESAPEAKE AND OHIO RAILWAY COMPANY
53
15
6
659
435
75
3207
142
N
LEGEND
U. S. NUMBERED HIGHWAYS
VIRGINIA PRIMARY HIGHWAYS
RAILROADS
TRANSMISSION LINES
NATURAL GAS LINES
COUNTY BOUNDARY
CORPORATE LIMITS
COUNTY SEAT
POWER SUBSTATION
STREAM GAGING STATION
20 DIRECTION OF AND AVERAGE FLOW IN MILLIONS OF GALLONS PER DAY (FLOWS OF LESS THAN 5 M.G.D. NOT SHOWN)
JAMES RIVER IS SOUTH BOUNDARY
ELECTION DISTRICT LINE
● LOCATION OF SAMPLE POTENTIALLY SUITABLE FOR CERAMIC PRODUCTS
X LOCATION OF SAMPLE WITH NO APPARENT VALUE FOR CERAMIC PRODUCTS
ECONOMIC DATA
FLUVANNA COUNTY
VIRGINIA
SCALE OF MILES

Figure 14.

SAMPLE: R-8520 COUNTY: Fluvanna

DATE: June, 1982 — Tuscaloosa Research Center

LOCALITY: N4,201,960 E745,090 (Zone 17) Zion Crossroads 7.5' quadrangle. Roadcut, 2.4 miles southeast of Troy, on the north side of State Road 631 approximately 0.65 mile by road west of its intersection with State Road 613.

DESCRIPTION: Light and red brown to moderate reddish-brown plastic clay and some dark yellowish-orange clay are present in a long roadcut that has a maximum height of 3.5 feet. Some quartz fragments are present in the clay near the base of the exposure. The clay is covered by 6 inches of yellowish-brown loamy overburden.

FORMATION OR AGE: Residual clay

SAMPLED INTERVAL: Representative channel sample across 3.5 feet of clay.

RAW PROPERTIES:

Working properties:	plastic
Water of plasticity:	44.3%
Drying shrinkage:	5.0%
Dry strength:	good
pH:	4.6

SLOW FIRING TEST:

Temp. °C	*Color*	*Hard-ness*	*%Lin. Shk.*	*% Abs.*	*% Appr. Por.*	*Bulk Dens. gm/cc*
1000	Moderate orange	3	10.0	34.5	50.2	1.45
1050	Moderate orange	3	10.0	26.8	43.5	1.62
1100	Brownish-orange	4	15.0	12.0	25.1	2.09
1150	Brownish-orange	4	15.0	11.7	24.4	2.10
1200	Strong brown	5	20.0	5.3	12.3	2.34
1250	Strong brown	5	20.0	4.0	9.5	2.37

Remarks: High shrinkage at maturity; no effervescence with HCl.

PRELIMINARY BLOATING TEST: Negative

POTENTIAL USE: Not suitable for structural clay products.

SAMPLE: R-8521A and R-8521B COUNTY: Fluvanna

DATE: June, 1982 — Tuscaloosa Research Center

LOCALITY: N4,198,870 E749,060 Zone 17 Zion Crossroads 7.5' quadrangle. Roadcut, 4.8 miles east of Wildwood, on the south side of State Road 629 approximately 0.3 mile by road east of its intersection with State Road 631.

DESCRIPTION: Yellowish-gray to pale olive and greenish phyllite is present in a 300-foot-long roadcut that has a maximum height of 6 feet. Light orange brown to dark yellowish-orange weathered phyllite with some dusky yellowish-brown weathered spots is present in the western part of the roadcut.

FORMATION OR AGE: Ordovician

R-8521A

SAMPLED INTERVAL: Composite of representative samples across 10 feet of phyllite.

RAW PROPERTIES:

Working properties:	short
Water of plasticity:	21.6%
Drying shrinkage:	0.0%
Dry strength:	fair
pH:	5.6

SLOW FIRING TEST:

Temp. °C	*Color*	*Hard-ness*	*%Lin. Shk.*	*% Abs.*	*% Appr. Por.*	*Bulk Dens. gm/cc*
1000	Light brown	3	2.5	23.2	40.5	1.74
1050	Light brown	3	2.5	22.3	39.4	1.75
1100	Moderate yellowish-pink	3	2.5	22.0	39.1	1.76
1150	Moderate yellowish-pink	3	2.5	22.0	38.7	1.79
1200	—	—	Melted	—	—	—
1250	—	—	—	—	—	—

Remarks: Too soft; no effervescence with HCl.

PRELIMINARY BLOATING TEST: Negative

POTENTIAL USE: Not suitable for structural clay products.

R-8521B

SAMPLED INTERVAL: Composite of representative samples across 20 feet of weathered phyllite.

RAW PROPERTIES:

Working properties:	plastic
Water of plasticity:	25.6%
Drying shrinkage:	2.5%
Dry strength:	good
pH:	5.8

SLOW FIRING TEST:

Temp. °C	*Color*	*Hard-ness*	*%Lin. Shk.*	*% Abs.*	*% Appr. Por.*	*Bulk Dens. gm/cc*
1000	Moderate orange	3	5.0	28.9	45.1	1.56
1050	Grayish-reddish-orange	3	5.0	26.1	42.3	1.62
1100	Grayish-reddish-orange	3	5.0	25.2	41.6	1.65
1150	Grayish-reddish-orange	3	5.0	24.7	41.1	1.66
1200	—	—	Melted	—	—	—
1250	—	—	—	—	—	—

Remarks: Too soft; no effervescence with HCl.

PRELIMINARY BLOATING TEST: Negative

POTENTIAL USE: Not suitable for structural clay products.

SAMPLE: R-8609 COUNTY: Fluvanna

DATE: March, 1983 — Tuscaloosa Research Center

LOCALITY: N4,206,910 E741,180 (Zone 17) Boyd Tavern 7.5' quadrangle. Roadcut, 2.1 miles north of Troy, on the east side of State Road 676 approximately 0.2 mile by road south of its intersection with U.S. Highway 250.

DESCRIPTION: Yellowish-orange to dark yellowish-orange soft shale and residuum and reddish-brown plastic clay are present in a long roadcut that has a maximum height of 3.5 feet. Grayish-orange schist with some quartz fragments is present near the base of the exposure.

FORMATION OR AGE: Residual clay

SAMPLED INTERVAL: Channel sample across 3 feet of clay.

RAW PROPERTIES:

Working properties:	plastic
Water of plasticity:	36.3%
Drying shrinkage:	5.0%
Dry strength:	good
pH:	4.5

SLOW FIRING TEST:

Temp. °C	*Color*	*Hard-ness*	*%Lin. Shk.*	*% Abs.*	*% Appr. Por.*	*Bulk Dens. gm/cc*
1000	Moderate orange	3	5.0	31.6	47.1	1.49
1050	Moderate orange	3	7.5	25.5	41.9	1.64
1100	Brownish-orange	4	10.0	16.6	31.9	1.93
1150	Brownish-orange	4	15.0	11.8	24.7	2.10
1200	Strong brown	5	15.0	10.3	22.1	2.15
1250	Strong brown	6	15.0	8.7	19.3	2.25

Remarks: Short firing range, high shrinkage at 1150°-1250°C; no effervescence with HCl.

PRELIMINARY BLOATING TEST: Negative.

POTENTIAL USE: Marginal for structural clay products (e.g., building brick at 1100°C).

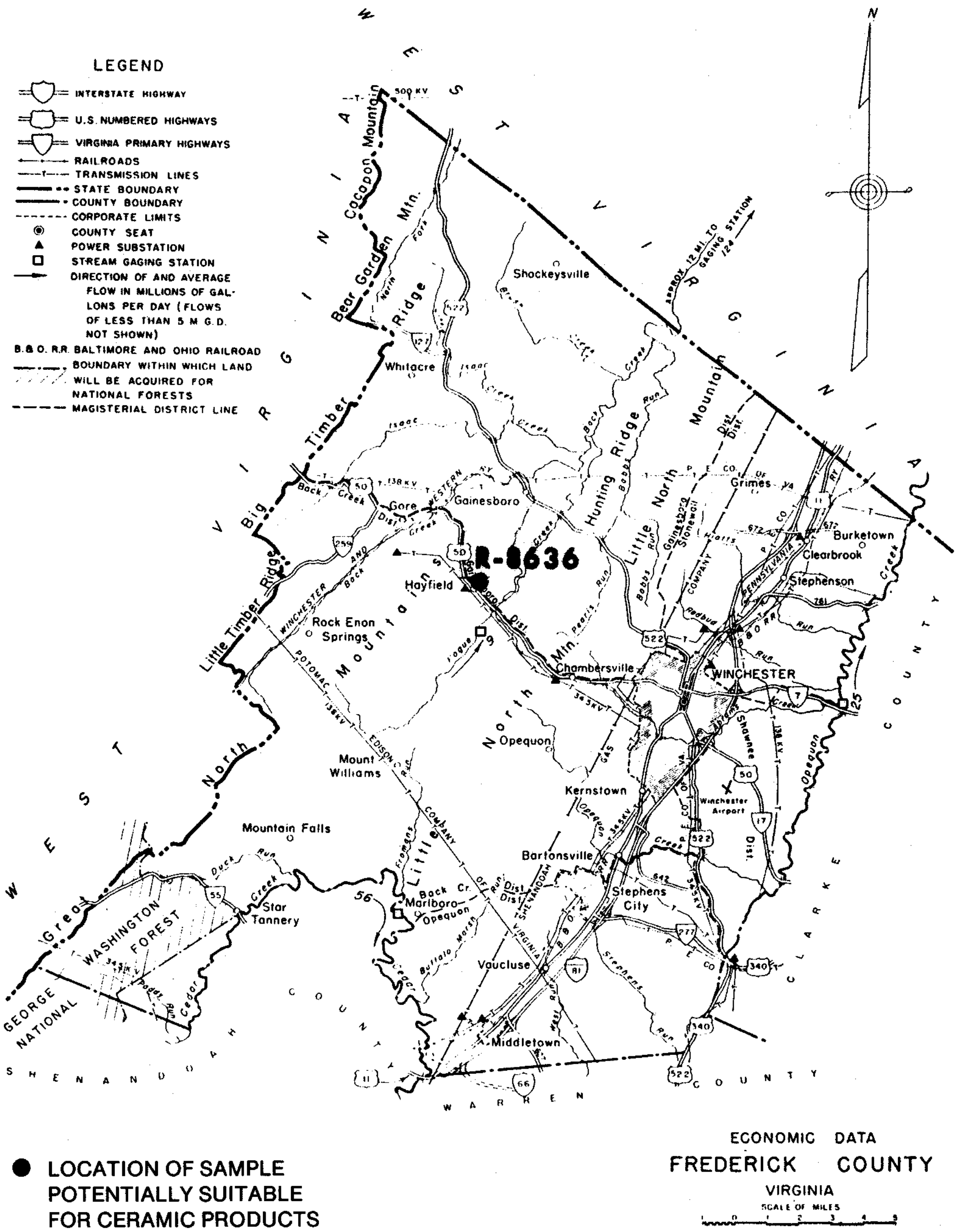

LEGEND
INTERSTATE HIGHWAY
U.S. NUMBERED HIGHWAYS
VIRGINIA PRIMARY HIGHWAYS
RAILROADS
TRANSMISSION LINES
STATE BOUNDARY
COUNTY BOUNDARY
CORPORATE LIMITS
COUNTY SEAT
POWER SUBSTATION
STREAM GAGING STATION
DIRECTION OF AND AVERAGE FLOW IN MILLIONS OF GALLONS PER DAY (FLOWS OF LESS THAN 5 M G.D. NOT SHOWN)
B.& O. R.R. BALTIMORE AND OHIO RAILROAD
BOUNDARY WITHIN WHICH LAND WILL BE ACQUIRED FOR NATIONAL FORESTS
MAGISTERIAL DISTRICT LINE
WEST VIRGINIA
R-8636
Shockeysville
Whitacre
Gainesboro
Gore
Hayfield
Rock Enon Springs
Chambersville
WINCHESTER
Burketown
Clearbrook
Stephenson
Grimes
Opequon
Kernstown
Mount Williams
Mountain Falls
Bartonsville
Stephens City
Star Tannery
Marlboro
Vaucluse
Middletown
Cacapon Mountain
Bear Garden Mtn.
North Ridge
Big Timber Ridge
Little Timber Ridge
Great North Mtn.
Little North Mtn.
Hunting Ridge
GEORGE WASHINGTON NATIONAL FOREST
SHENANDOAH COUNTY
WARREN COUNTY
CLARKE COUNTY
LOCATION OF SAMPLE POTENTIALLY SUITABLE FOR CERAMIC PRODUCTS
ECONOMIC DATA
FREDERICK COUNTY
VIRGINIA
SCALE OF MILES

Figure 15.

SAMPLE: R-8636 COUNTY: Frederick

DATE: November, 1983 — Tuscaloosa Research Center

LOCALITY: N4,345,940 E733,870 (Zone 17) Hayfield 7.5' quadrangle. Roadcut at Hayfield on the northeast side of U. S. Highway 50 at its intersection with State Road 600.

DESCRIPTION: Buff to very pale orange to yellowish-gray to grayish-orange pink bentonite is present in a long roadcut that has a maximum height of 10 feet. The 2-foot-thick bentonite contains some dark purple to black stain and weathers to a darker grayish-orange in places. It is overlain by the black, fissile Marcellus Shale and overlies the gray to olive Needmore Shale.

FORMATION OR AGE: Tioga Bentonite

SAMPLED INTERVAL: Composite representative sample across the bentonite in two places 15 feet apart.

RAW PROPERTIES:

Working properties:	plastic
Water of plasticity:	27.7%
Drying shrinkage:	5.0%
Dry strength:	good
pH:	7.4

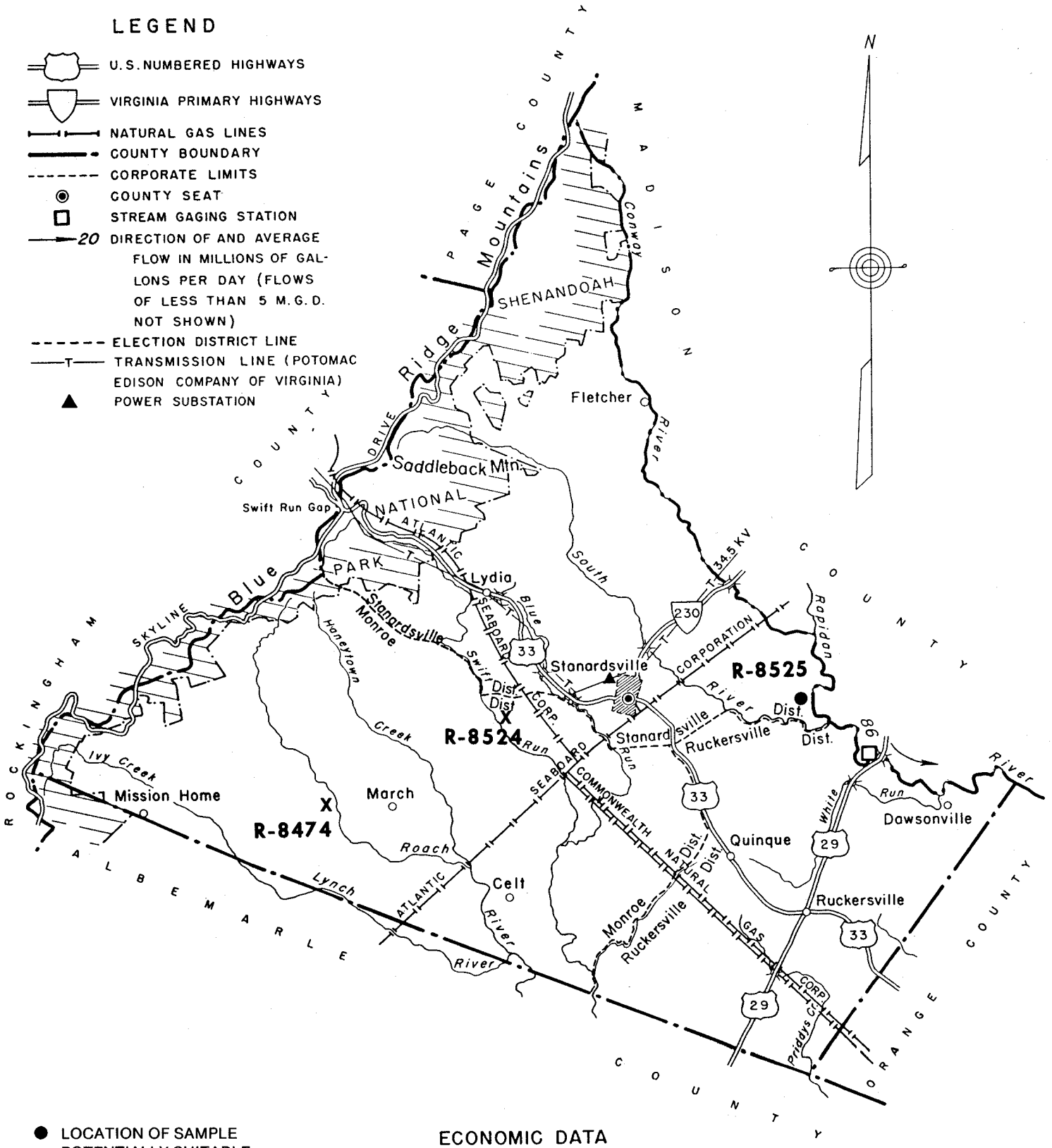
SLOW FIRING TEST:

Temp. °C	*Color*	*Hard-ness*	*%Lin. Shk.*	*% Abs.*	*% Appr. Por.*	*Bulk Dens. gm/cc*
1000	Moderate orange	3	7.5	24.3	39.3	1.61
1050	Moderate orange	3	7.5	22.0	36.8	1.67
1100	Moderate orange	4	10.0	17.6	31.6	1.80
1150	Grayish-reddish-orange	4	10.0	14.9	27.9	1.87
1200	Light brown	5	12.5	9.2	18.9	2.05
1250	Grayish-brown	5	12.5	5.3	11.1	2.11

Remarks: Slightly high shrinkage at 1200°-1250°C; no effervescence with HCl.

PRELIMINARY BLOATING TEST: Negative

POTENTIAL USE: Structural clay products (e.g. building brick at 1100°-1250°C).



● LOCATION OF SAMPLE POTENTIALLY SUITABLE FOR CERAMIC PRODUCTS

X LOCATION OF SAMPLE WITH NO APPARENT VALUE FOR CERAMIC PRODUCTS

ECONOMIC DATA

GREENE COUNTY

VIRGINIA

SCALE OF MILES

1 0 1 2 3 4 5

Figure 16.

SAMPLE: R-8474 COUNTY: Greene

DATE: October, 1981 — Tuscaloosa Research Center

LOCALITY: N4,238,410 E715,450 (Zone 17) Swift Run Gap 7.5' quadrangle. Roadcut, 0.8 mile west of March, on the south side of State Road 615 approximately 0.35 mile by road east of its intersection with State Road 650.

DESCRIPTION: Dark red to moderate reddish-orange and dark yellowish-orange clay is present in a long roadcut that has a maximum height of 6 feet. Grayish-orange clay, with some quartz pebbles is present in the lower part of the exposure. The top 1.5 feet of the roadcut is grassed over.

FORMATION OR AGE: Residual clay

SAMPLED INTERVAL: Representative channel sample across 4.5 feet of clay.

RAW PROPERTIES:

Working properties:	plastic
Water of plasticity:	32.0%
Drying shrinkage:	5.0%
Dry strength:	good
pH:	3.9

SLOW FIRING TEST:

Temp. °C	*Color*	*Hard-ness*	*%Lin. Shk.*	*% Abs.*	*% Appr. Por.*	*Bulk Dens. gm/cc*
1000	Moderate orange	3	7.5	24.8	41.1	1.66
1050	Brownish-orange	3	7.5	23.7	40.3	1.70
1100	Brownish-orange	3	10.0	17.1	32.7	1.91
1150	Brownish-orange	3	10.0	14.6	28.9	1.98
1200	Brownish-orange	3	10.0	13.8	28.0	2.03
1250	Strong orange	3	12.5	13.7	27.7	2.03

Remarks: Too soft; no effervescence with HCl.

PRELIMINARY BLOATING TEST: Negative

POTENTIAL USE: Not suitable for structural clay products.

SAMPLE: R-8524 COUNTY: Greene

DATE: June, 1982 — Tuscaloosa Research Center

LOCALITY: N4,241,270 E720,580 (Zone 17) Stanardsville 7.5' quadrangle. Roadcut, 2.3 miles west of Stanardsville on the north side of State Road 624 approximately 0.1 mile by road east of its intersection with State Road 646.

DESCRIPTION: Moderate to dark reddish-brown slightly silty clay is present in a 300-foot-long roadcut that has a maximum height of 5 feet. Some dark reddish-orange and yellowish-gray silty clay is present towards the base of the exposure.

FORMATION OR AGE: Residual clay

SAMPLED INTERVAL: Representative channel sample across 5 feet of clay.

RAW PROPERTIES:

Working properties:	plastic
Water of plasticity:	36.2%
Drying shrinkage:	5.0%
Dry strength:	good
pH:	4.5

SLOW FIRING TEST:

Temp. °C	*Color*	*Hard-ness*	*%Lin. Shk.*	*% Abs.*	*% Appr. Por.*	*Bulk Dens. gm/cc*
1000	Moderate orange	3	7.5	28.7	45.8	1.60
1050	Brownish-orange	3	7.5	26.7	43.8	1.64
1100	Brownish-orange	3	10.0	21.2	38.1	1.79
1150	Brownish-orange	3	10.0	21.1	38.1	1.81
1200	Strong brown	4	15.0	12.0	25.7	2.14
1250	Strong brown	4	15.0	10.6	23.3	2.20

Remarks: High shrinkage at maturity; no effervescence with HCl.

PRELIMINARY BLOATING TEST: Negative

POTENTIAL USE: Not suitable for structural clay products.

SAMPLE: R-8525 COUNTY: Greene

DATE: June, 1982 — Tuscaloosa Research Center

LOCALITY: N4,242,240 E729,520 (Zone 17) Stanardsville 7.5' quadrangle. Roadcut, 3.3 miles east of Stanardsville on the east side of State Road 619 approximately 0.65 mile by road north of its crossing over the South River.

DESCRIPTION: Moderate to dark reddish-brown plastic clay, which overlies a reddish-orange silty clay containing some rounded quartz pebbles, is present in a 200-foot-long roadcut that has a maximum height of 5 feet. Some grayish-orange plastic clay is also present and it is covered by a loamy, silty overburden.

FORMATION OR AGE: Residual clay

SAMPLED INTERVAL: Representative channel sample across 4 feet of clay.

RAW PROPERTIES:

Working properties:	plastic
Water of plasticity:	29.6%
Drying shrinkage:	5.0%
Dry strength:	good
pH:	4.4

SLOW FIRING TEST:

Temp. °C	*Color*	*Hard-ness*	*%Lin. Shk.*	*% Abs.*	*% Appr. Por.*	*Bulk Dens. gm/cc*
1000	Moderate orange	3	7.5	25.2	41.7	1.65
1050	Moderate orange	3	7.5	23.0	39.1	1.70
1100	Grayish-reddish-orange	4	10.0	17.7	32.7	1.85
1150	Brownish-orange	4	10.0	17.1	32.2	1.88
1200	Grayish-reddish-orange	4	12.5	11.4	23.9	2.09
1250	Strong brown	4	12.5	9.1	19.7	2.17

Remarks: Slightly high shrinkage at 1200°-1250°C; no effervescence with HCl.

PRELIMINARY BLOATING TEST: Negative

POTENTIAL USE: Structural clay products (e.g., building brick at 1000°-1250°C).

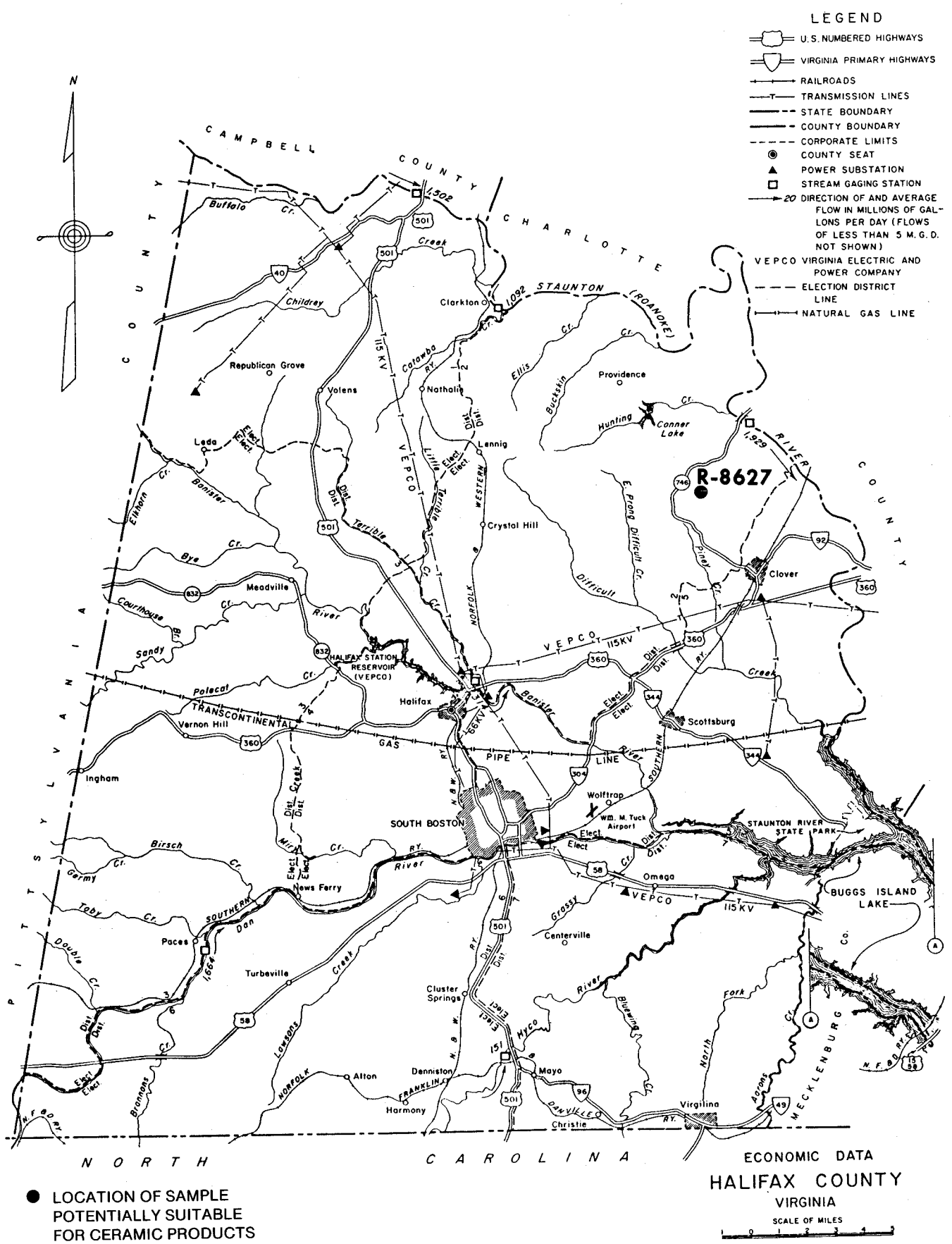

LEGEND
U.S. NUMBERED HIGHWAYS
VIRGINIA PRIMARY HIGHWAYS
RAILROADS
TRANSMISSION LINES
STATE BOUNDARY
COUNTY BOUNDARY
CORPORATE LIMITS
COUNTY SEAT
POWER SUBSTATION
STREAM GAGING STATION
20 DIRECTION OF AND AVERAGE FLOW IN MILLIONS OF GALLONS PER DAY (FLOWS OF LESS THAN 5 M.G.D. NOT SHOWN)
VEPCO VIRGINIA ELECTRIC AND POWER COMPANY
ELECTION DISTRICT LINE
NATURAL GAS LINE
N
CAMPBELL COUNTY
CHARLOTTE COUNTY
PITTSYLVANIA COUNTY
NORTH CAROLINA
R-8627
Clarkton
Republican Grove
Volens
Nathalie
Providence
Conner Lake
Leda
Lennig
Crystal Hill
Clover
Meadville
Halifax
HALIFAX STATION RESERVOIR (VEPCO)
Scottsburg
Vernon Hill
Ingham
SOUTH BOSTON
Wolftrap
Wm. M. Tuck Airport
STAUNTON RIVER STATE PARK
Omega
BUGGS ISLAND LAKE
News Ferry
Centerville
Paces
Turbeville
Cluster Springs
Alton
Dennistone
Harmony
Mayo
Virgilina
Christie
TRANSCONTINENTAL GAS PIPE LINE
VEPCO 115KV
66KV
STAUNTON (ROANOKE)
ECONOMIC DATA
HALIFAX COUNTY
VIRGINIA
SCALE OF MILES
LOCATION OF SAMPLE POTENTIALLY SUITABLE FOR CERAMIC PRODUCTS

Figure 17.

SAMPLE: R-8627 COUNTY: Halifax

DATE: July, 1983 — Tuscaloosa Research Center

LOCALITY: N4,083,240 E698,910 (Zone 17) Conner Lake 7.5' quadrangle. Ditchcut, 3.6 miles northwest of Clover, on the north side of State Road 778 approximately 0.95 mile by road east of its intersection with State Road 746.

DESCRIPTION: Light to moderate olive brown plastic clay is present in a ditchcut. The clay, which contains some organic matter, fragments of feldspar and rounded quartz pebbles, dries to hard compact material.

FORMATION OR AGE: Transported clay

SAMPLED INTERVAL: Representative channel sample across 3 feet of clay.

RAW PROPERTIES:

Working properties:	plastic
Water of plasticity:	21.7%
Drying shrinkage:	5.0%
Dry strength:	good
pH:	5.2

SLOW FIRING TEST:

Temp. °C	*Color*	*Hard-ness*	*%Lin. Shk.*	*% Abs.*	*% Appr. Por.*	*Bulk Dens. gm/cc*
1000	Moderate orange	4	7.5	13.9	26.7	1.93
1050	Moderate orange	4	7.5	12.8	24.7	1.94
1100	Grayish-reddish-orange	4	7.5	11.1	22.5	2.02
1150	Grayish-reddish-orange	4	7.5	10.8	21.9	2.02
1200	Moderate reddish-brown	5	10.0	10.4	21.2	2.04
1250	Moderate reddish-brown	5	10.0	9.9	20.5	2.07

Remarks: Excellent firing range: no effervescence with HCl.

PRELIMINARY BLOATING TEST: Negative

POTENTIAL USE: Structural clay products (e.g., building brick at 1000°-1250°C).

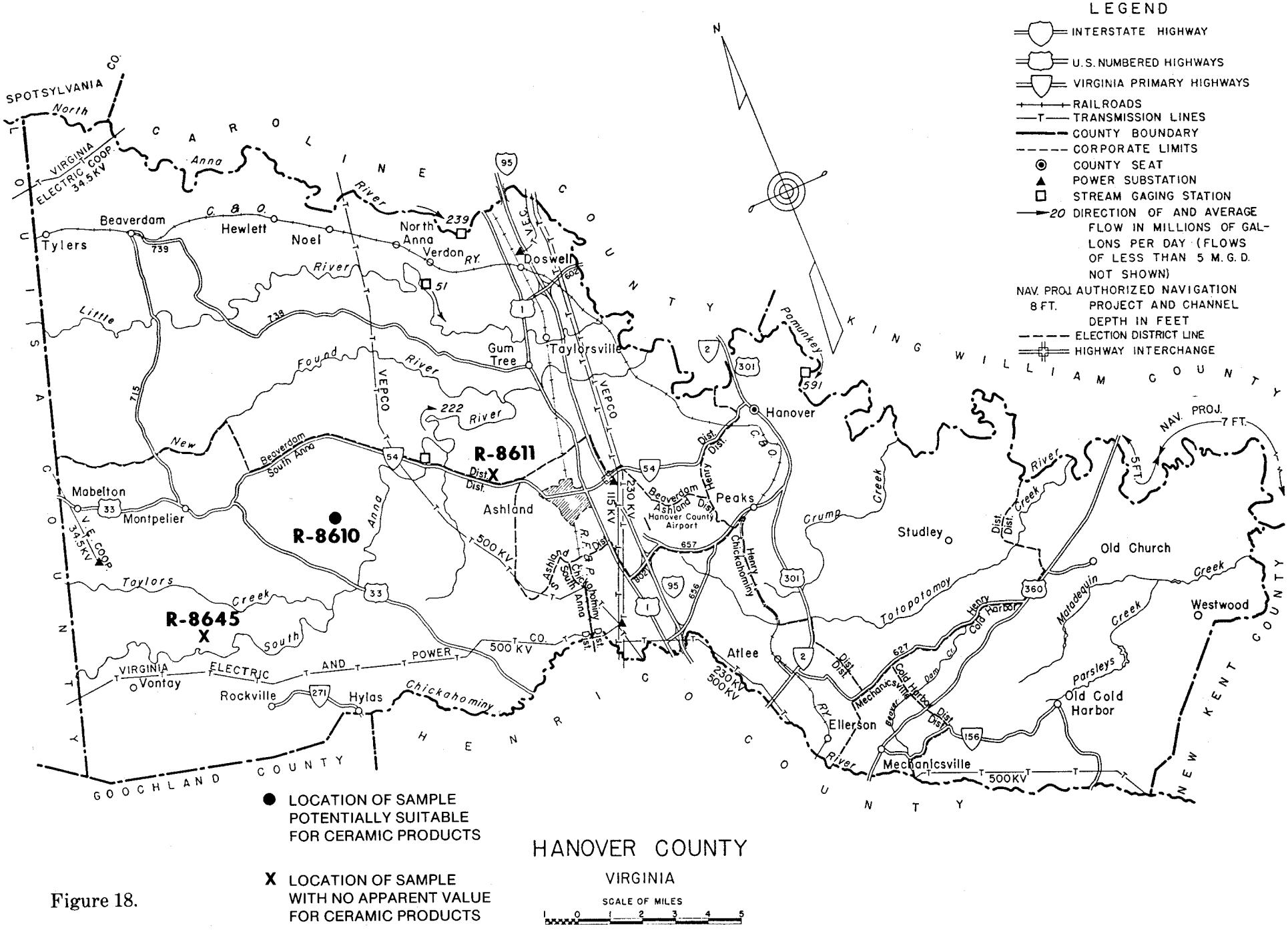

LEGEND
INTERSTATE HIGHWAY
U.S. NUMBERED HIGHWAYS
VIRGINIA PRIMARY HIGHWAYS
RAILROADS
TRANSMISSION LINES
COUNTY BOUNDARY
CORPORATE LIMITS
COUNTY SEAT
POWER SUBSTATION
STREAM GAGING STATION
20 DIRECTION OF AND AVERAGE FLOW IN MILLIONS OF GALLONS PER DAY (FLOWS OF LESS THAN 5 M.G.D. NOT SHOWN)
NAV. PROJ. 8 FT. AUTHORIZED NAVIGATION PROJECT AND CHANNEL DEPTH IN FEET
ELECTION DISTRICT LINE
HIGHWAY INTERCHANGE
N
SPOTSYLVANIA CO.
CAROLINE COUNTY
KING WILLIAM COUNTY
HENRICO COUNTY
NEW KENT COUNTY
GOOCHLAND COUNTY
CHESTERFIELD COUNTY
North Anna River
Little River
Found River
New River
Taylors Creek
South Anna River
Chickahominy River
Pamunkey River
Mattaponi River
Totopotomoy Creek
Crump Creek
Beaverdam
Tylers
Hewlett
Noel
North Anna
Verdon
Doswell
Gum Tree
Taylorsville
Hanover
Peaks
Ashland
Beaverdam Ashland
Hanover County Airport
Studley
Old Church
Westwood
Old Cold Harbor
Mechanicsville
Atlee
Ellerson
Rockville
Hylas
Vontay
Montpelier
Mabelton
R-8611
R-8610
R-8645
VEPCO
VIRGINIA ELECTRIC COOP. 34.5 KV
VIRGINIA ELECTRIC AND POWER CO. 500 KV
115 KV
230 KV
500 KV
C. & O.
R. F. & P.
NAV. PROJ. 7 FT.
5 FT.
● LOCATION OF SAMPLE POTENTIALLY SUITABLE FOR CERAMIC PRODUCTS
X LOCATION OF SAMPLE WITH NO APPARENT VALUE FOR CERAMIC PRODUCTS
HANOVER COUNTY
VIRGINIA
SCALE OF MILES
0 1 2 3 4 5

Figure 18.

SAMPLE: R-8610 COUNTY: Hanover

DATE: March, 1983 — Tuscaloosa Research Center

LOCALITY: N4,186,310 E270,000 (Zone 18) Hanover Academy 7.5' quadrangle. Roadcut, 3.8 miles southeast of Montpelier, on the east side of State Road 671 approximately 0.1 mile by road north of its intersection with State Road 657.

DESCRIPTION: Variegated light reddish-brown and reddish-brown plastic to gritty clay is present in a 250-foot-long roadcut that has a maximum height of 7 feet. The reddish-brown clay contains some mica and fragments of quartz. Dark yellowish-orange plastic clay mottlings are also present.

FORMATION OR AGE: Residual clay.

SAMPLED INTERVAL: Channel sample across the top 5 feet of the exposure.

RAW PROPERTIES:

Working properties:	short
Water of plasticity:	32.2%
Drying shrinkage:	5.0%
Dry strength:	fair
pH:	4.6

SLOW FIRING TEST:

Temp. °C	*Color*	*Hard-ness*	*%Lin. Shk.*	*% Abs.*	*% Appr. Por.*	*Bulk Dens. gm/cc*
1000	Moderate orange	2	5.0	28.9	44.5	1.54
1050	Moderate orange	2	5.0	27.8	43.5	1.56
1100	Moderate orange	3	7.5	25.7	41.4	1.61
1150	Moderate orange	3	7.5	22.1	38.0	1.72
1200	Brownish-orange	3	7.5	21.2	37.1	1.75
1250	Strong brown	4	10.0	20.1	35.3	1.76

Remarks: No effervescence with HCl.

PRELIMINARY BLOATING TEST: Negative

POTENTIAL USE: Structural clay products (e.g., building brick at 1250°C).

SAMPLE: R-8611 COUNTY: Hanover

DATE: March, 1983 — Tuscaloosa Research Center

LOCALITY: N4,184,010 E278,090 (Zone 18) Hanover Academy 7.5' quadrangle. Roadcut, 2.1 miles southeast of the South Anna River on the northeast side of Virginia Highway 54 at its intersection with State Road 666.

DESCRIPTION: Variegated dark yellowish-orange and reddish-brown to dark reddish-brown plastic and gritty clay is present in the top of a long roadcut that has a maximum height of 3.5 feet. Gray, red and yellow mottlings are present near the base where the clay becomes very gritty and slightly saprolitic.

FORMATION OR AGE: Residual clay

SAMPLED INTERVAL: Channel sample across 3.5 feet of clay.

RAW PROPERTIES:

Working properties:	short
Water of plasticity:	26.9%
Drying shrinkage:	5.0%
Dry strength:	poor
pH:	4.3

SLOW FIRING TEST:

Temp. °C	*Color*	*Hard-ness*	*%Lin. Shk.*	*% Abs.*	*% Appr. Por.*	*Bulk Dens. gm/cc*
1000	Moderate orange	2	5.0	22.1	37.5	1.69
1050	Moderate orange	2	5.0	21.9	37.2	1.70
1100	Moderate orange	2	7.5	21.2	36.3	1.71
1150	Moderate orange	2	7.5	20.2	35.6	1.76
1200	Brownish-orange	2	7.5	19.1	34.2	1.78
1250	Brownish-orange	2	7.5	18.9	33.8	1.79

Remarks: Too soft, no effervescence with HCl.

PRELIMINARY BLOATING TEST: Negative

POTENTIAL USE: Not suitable for structural clay products.

SAMPLE: R-8645 COUNTY: Hanover

DATE: November, 1983 — Tuscaloosa Research Center

LOCALITY: N4,184,180 E260,970 (Zone 18) Montpelier 7.5' quadrangle. Exposure, 3.5 miles southwest of Montpelier, in the northwest portion of the pit of The Feldspar Corporation.

DESCRIPTION: White residuum over anorthosite

FORMATION OR AGE: Residuum over anorthosite.

SAMPLED INTERVAL: Composite channel sample across 3 feet of residuum.

RAW PROPERTIES:

Working properties:
Water of plasticity:
Drying shrinkage:
Dry strength:
pH:

SLOW FIRING TEST:

Temp. °C	*Color*	*Hard-ness*	*%Lin. Shk.*	*% Abs.*	*% Appr. Por.*	*Bulk Dens. gm/cc*
—	—	—	—	—	—	—
—	—	—	—	—	—	—
—	—	—	—	—	—	—
—	—	—	—	—	—	—
—	—	—	—	—	—	—
—	—	—	—	—	—	—

Remarks: No bond

REFLECTANCE TESTS: Brightness 78.0; tint 7.2; whiteness 49.2

POTENTIAL USE: Not suitable for structural clay products.

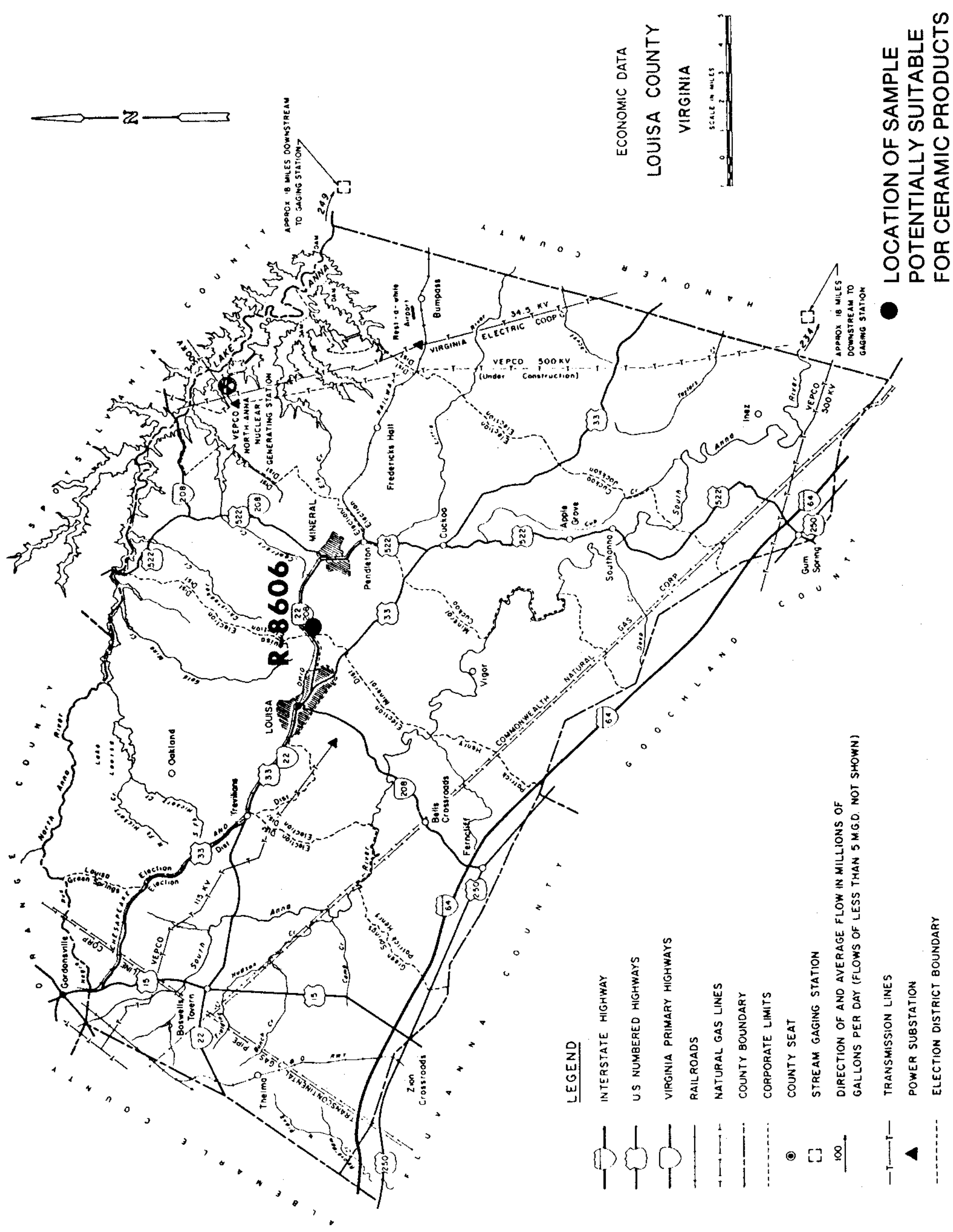

ECONOMIC DATA
LOUISA COUNTY
VIRGINIA
LOCATION OF SAMPLE POTENTIALLY SUITABLE FOR CERAMIC PRODUCTS
R-8606
LEGEND
INTERSTATE HIGHWAY
U.S. NUMBERED HIGHWAYS
VIRGINIA PRIMARY HIGHWAYS
RAILROADS
NATURAL GAS LINES
COUNTY BOUNDARY
CORPORATE LIMITS
COUNTY SEAT
STREAM GAGING STATION
DIRECTION OF AND AVERAGE FLOW IN MILLIONS OF GALLONS PER DAY (FLOWS OF LESS THAN 5 M.G.D. NOT SHOWN)
TRANSMISSION LINES
POWER SUBSTATION
ELECTION DISTRICT BOUNDARY
LOUISA
MINERAL
VEPCO NORTH ANNA NUCLEAR GENERATING STATION
VEPCO 500 KV (Under Construction)
LAKE ANNA
Gordonsville
Trevilians
Oakland
Vigor
Pendleton
Cuckoo
Fredericks Hall
Bumpass
Apple Grove
Southanna
Gum Spring
Bells Crossroads
Ferncliff
Zion Crossroads
Boswell's Tavern
Green Springs
Thelma
Inez
ORANGE COUNTY
SPOTSYLVANIA COUNTY
HANOVER COUNTY
GOOCHLAND COUNTY
FLUVANNA COUNTY
ALBEMARLE COUNTY

Figure 19.

SAMPLE: R-8606 COUNTY: Louisa

DATE: March, 1983 — Tuscaloosa Research Center

LOCALITY: N4,211,900 E240,310 (Zone 18) Mineral 7.5' quadrangle. Roadcut, 2.5 miles east of Louisa, on the south side of Virginia Highway 22 at its intersection with State Road 767.

DESCRIPTION: Pale yellowish-orange to yellowish-orange, light brown and some red mottled plastic clay is present in a 200-foot-long roadcut that has a maximum height of 4.5 feet. Some quartz fragments are present and a steeply dipping quartz vein occurs in the eastern end of the roadcut.

FORMATION OR AGE: Residual clay

SAMPLED INTERVAL: Channel sample across 4 feet of clay.

RAW PROPERTIES:

Working properties:	plastic
Water of plasticity:	34.4%
Drying shrinkage:	5.0%
Dry strength:	good
pH:	4.4

SLOW FIRING TEST:

Temp. °C	*Color*	*Hard-ness*	*%Lin. Shk.*	*% Abs.*	*% Appr. Por.*	*Bulk Dens. gm/cc*
1000	Moderate orange	4	5.0	26.0	41.2	1.58
1050	Moderate orange	4	7.5	25.8	41.1	1.59
1100	Moderate orange	4	7.5	25.0	40.3	1.61
1150	Moderate orange	4	10.0	19.9	34.9	1.76
1200	Moderate orange	4	12.5	16.5	30.8	1.87
1250	Grayish-reddish-orange	4	12.5	16.5	29.0	1.87

Remarks: Slightly high shrinkage at 1200°-1250°C; no effervescence with HCl.

PRELIMINARY BLOATING TEST: Negative

POTENTIAL USE: Marginal for structural clay products (e.g., building brick at 1150°-1250°C).

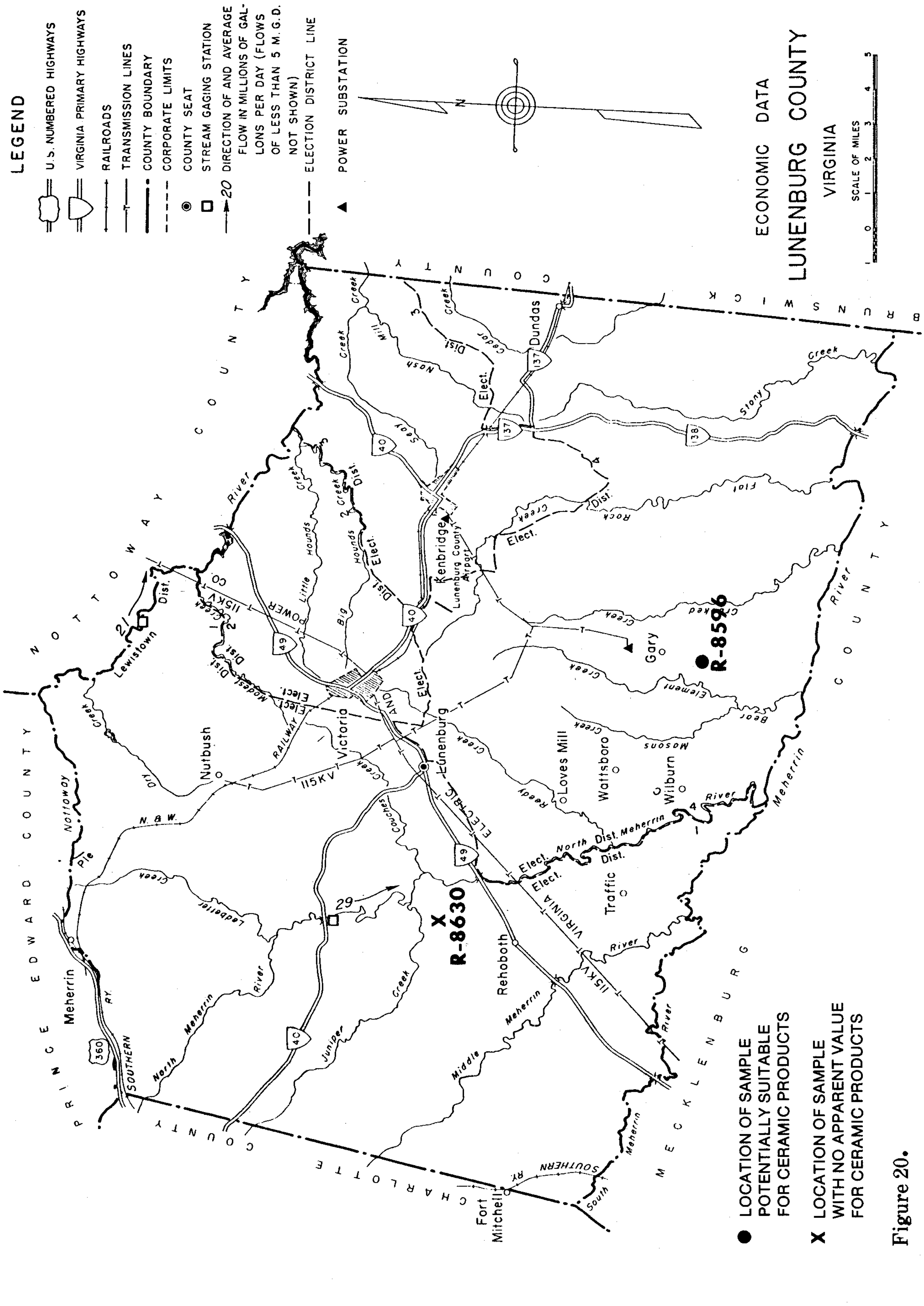

LEGEND
U.S. NUMBERED HIGHWAYS
VIRGINIA PRIMARY HIGHWAYS
RAILROADS
TRANSMISSION LINES
COUNTY BOUNDARY
CORPORATE LIMITS
COUNTY SEAT
STREAM GAGING STATION
20 DIRECTION OF AND AVERAGE FLOW IN MILLIONS OF GALLONS PER DAY (FLOWS OF LESS THAN 5 M.G.D. NOT SHOWN)
ELECTION DISTRICT LINE
POWER SUBSTATION
ECONOMIC DATA
LUNENBURG COUNTY
VIRGINIA
SCALE OF MILES
N
NOTTOWAY COUNTY
PRINCE EDWARD COUNTY
CHARLOTTE COUNTY
MECKLENBURG COUNTY
BRUNSWICK COUNTY
Lunenburg
Victoria
Kenbridge
Dundas
Nutbush
Meherrin
Lewistown
Rehoboth
Traffic
Loves Mill
Wattsboro
Wilburn
Gary
Fort Mitchell
R-8630
R-8596
LOCATION OF SAMPLE POTENTIALLY SUITABLE FOR CERAMIC PRODUCTS
X LOCATION OF SAMPLE WITH NO APPARENT VALUE FOR CERAMIC PRODUCTS

Figure 20.

SAMPLE: R-8596 COUNTY: Lunenburg

DATE: January, 1983 — Tuscaloosa Research Center

LOCALITY: N4,081,080 E749,230 (Zone 17) North View 7.5' quadrangle. Roadcut, 2.75 miles north of the Meherrin River at the Lunenburg-Mecklenburg County line, on the east side of State Road 635 approximately 0.3 mile by road south of its intersection with State Road 640.

DESCRIPTION: Light reddish-brown plastic clay is present in a long roadcut that has a maximum height of 6 feet. Some grayish-orange and dark yellowish-orange clay mottlings are present in the exposure.

FORMATION OR AGE: Residual clay

SAMPLED INTERVAL: Composite channel sample across 5 feet of clay.

RAW PROPERTIES:

Working properties:	plastic
Water of plasticity:	39.2%
Drying shrinkage:	7.5%
Dry strength:	good
pH:	4.4

SLOW FIRING TEST:

Temp. °C	*Color*	*Hard-ness*	*%Lin. Shk.*	*% Abs.*	*% Appr. Por.*	*Bulk Dens. gm/cc*
1000	Moderate orange	3	7.5	28.5	44.4	1.56
1050	Moderate orange	3	7.5	25.8	42.0	1.63
1100	Moderate orange	4	10.0	16.7	31.9	1.91
1150	Brownish-orange	4	12.5	13.6	27.5	2.01
1200	Brownish-orange	4	15.0	11.4	23.9	2.09
1250	Strong brown	4	15.0	10.1	21.6	2.14

Remarks: High shrinkage at 1200°-1250°C., slightly high shrinkage at 1150°; no effervescence with HCl.

PRELIMINARY BLOATING TEST: Negative

POTENTIAL USE: Structural clay products (e.g., building brick at 1100°-1150°C).

SAMPLE: R-8630 COUNTY: Lunenburg

DATE: November, 1983 — Tuscaloosa Research Center

LOCALITY: N4,092,590 E736,840 (Zone 17) Lunenburg 7.5' quadrangle. Roadcut, 2.3 miles northeast of Rehoboth, on the southeast side of State Road 690 just northeast of its intersection with State Road 692.

DESCRIPTION: Pale to dark reddish-brown, hard plastic clay is present in a long roadcut that has a maximum height of 4.5 feet. The clay is covered by about 6 inches of brownish silty overburden.

FORMATION OR AGE: Residual clay

SAMPLED INTERVAL: Representative channel sample across 4 feet of clay.

RAW PROPERTIES:

Working properties:	plastic
Water of plasticity:	42.6%
Drying shrinkage:	10.0%
Dry strength:	good
pH:	8.0

SLOW FIRING TEST:

Temp. °C	*Color*	*Hard-ness*	*%Lin. Shk.*	*% Abs.*	*% Appr. Por.*	*Bulk Dens. gm/cc*
1000	Moderate orange	3	12.5	28.8	44.8	1.51
1050	Moderate reddish-orange	3	12.5	27.5	43.6	1.63
1100	Moderate reddish-orange	3	15.0	21.8	38.9	1.78
1150	Grayish-reddish-orange	7	20.0	14.8	30.5	2.06
1200	Grayish-reddish-orange	7	20.0	11.5	25.3	2.19
1250	Moderate reddish-brown	7	20.0	10.2	23.1	2.26

Remarks: High shrinkage at maturity; no effervescence with HCl.

PRELIMINARY BLOATING TEST: Negative

POTENTIAL USE: Not suitable for structural clay products.

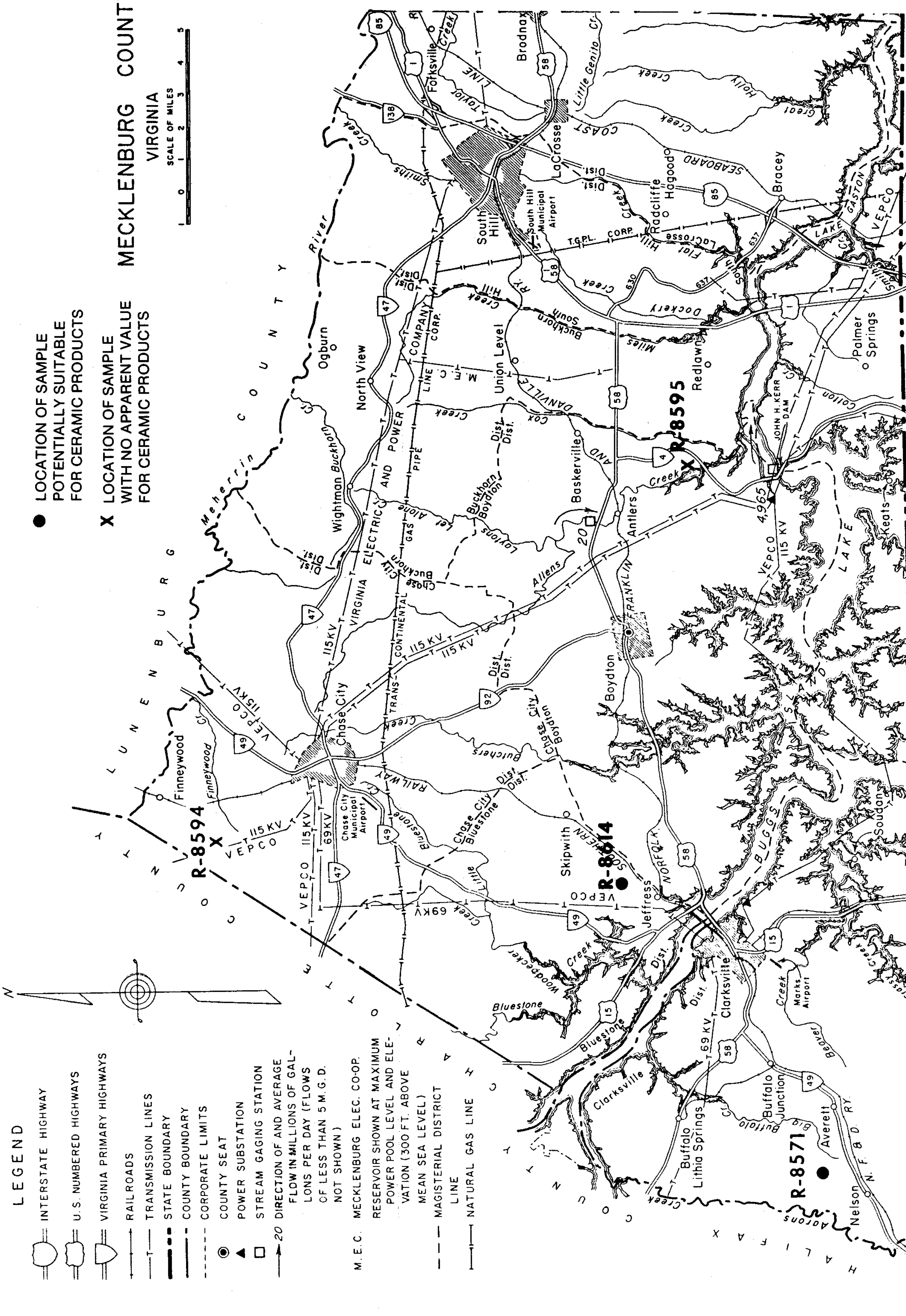

MECKLENBURG COUNTY
VIRGINIA
SCALE OF MILES
0 1 2 3 4 5
● LOCATION OF SAMPLE POTENTIALLY SUITABLE FOR CERAMIC PRODUCTS
X LOCATION OF SAMPLE WITH NO APPARENT VALUE FOR CERAMIC PRODUCTS
LEGEND
INTERSTATE HIGHWAY
U.S. NUMBERED HIGHWAYS
VIRGINIA PRIMARY HIGHWAYS
RAILROADS
TRANSMISSION LINES
STATE BOUNDARY
COUNTY BOUNDARY
CORPORATE LIMITS
COUNTY SEAT
POWER SUBSTATION
STREAM GAGING STATION
20 DIRECTION OF AND AVERAGE FLOW IN MILLIONS OF GALLONS PER DAY (FLOWS OF LESS THAN 5 M.G.D. NOT SHOWN)
M.E.C. MECKLENBURG ELEC. CO-OP.
RESERVOIR SHOWN AT MAXIMUM POWER POOL LEVEL AND ELEVATION (300 FT. ABOVE MEAN SEA LEVEL)
MAGISTERIAL DISTRICT LINE
NATURAL GAS LINE
R-8594
R-8614
R-8595
R-8571
LUNENBURG COUNTY
CHARLOTTE COUNTY
HALIFAX COUNTY
BRUNSWICK COUNTY
NORTH CAROLINA
South Hill
LaCrosse
Chase City
Boydton
Clarksville
Baskerville
Skipwith
Bracey
Brodnax
North View
Union Level
Redlawn
Palmer Springs
Antlers
Wightman
Ogburn
Finneywood
Jeffress
Bluestone
Buffalo Junction
Buffalo Lithia Springs
Averett
Nelson
Soudan
Keats
JOHN H. KERR DAM
Meherrin River
BUGGS ISLAND LAKE
LAKE GASTON
VEPCO 115 KV
VIRGINIA ELECTRIC AND POWER COMPANY
TRANSCONTINENTAL GAS PIPE LINE CORP.
SOUTHERN RY.
SEABOARD COAST LINE
NORFOLK AND WESTERN

Figure 21.

SAMPLE: R-8571 COUNTY: Mecklenburg

DATE: October, 1982 — Tuscaloosa Research Center

LOCALITY: N4,050,980 E706,310 (Zone 17) Nelson 7.5' quadrangle. Excavation, 1.6 miles north-northeast of Nelson, 150 ft. off the northeast side of State Road 604 approximately 1.05 miles by road northwest of its intersection with Virginia Highway 49.

DESCRIPTION: Very pale to grayish and dark yellowish-orange, light brown and light olive gray clay is present in a hand-dug excavation. The clay is silty near the top, but becomes darker in color and much more plastic at the bottom of the hole.

FORMATION OR AGE: Residuum over Aaron Slate

SAMPLED INTERVAL: Representative channel sample across 2.5 feet of clay.

RAW PROPERTIES:

Working properties:	plastic
Water of plasticity:	28.2%
Drying shrinkage:	7.5%
Dry strength:	good
pH:	4.4

SLOW FIRING TEST:

Temp. °C	*Color*	*Hard-ness*	*%Lin. Shk.*	*% Abs.*	*% Appr. Por.*	*Bulk Dens. gm/cc*
1000	Moderate orange	3	7.5	19.4	34.2	1.76
1050	Moderate orange	4	7.5	19.1	34.1	1.78
1100	Moderate orange	4	10.0	14.9	28.3	1.90
1150	Brownish-orange	4	10.0	14.0	27.0	1.92
1200	Brownish-orange	4	10.0	13.2	25.7	1.95
1250	Brownish-orange	4	10.0	12.2	24.1	1.98

Remarks: Excellent firing range; no effervescence with HCl.

PRELIMINARY BLOATING TEST: Negative

POTENTIAL USE: Structural clay products (e.g., building brick at 1050°-1250°C).

SAMPLE: R-8594 COUNTY: Mecklenburg

DATE: January, 1983 — Tuscaloosa Research Center

LOCALITY: N4,081,280 E723,080 (Zone 17) Chase City 7.5' quadrangle. Roadcut, 1.75 miles southwest of Finneywood, on the northeast side of Virginia Highway 49 approximately 0.6 mile by road southeast of its intersection with State Road 744.

DESCRIPTION: Moderate to dark reddish-brown plastic clay is present in a 125-foot-long roadcut (grassed toward the northwest end) that has a maximum height of 6 feet. Some minor dark yellowish-orange plastic clay mottlings are present.

FORMATION OR AGE: Residual clay

SAMPLED INTERVAL: Composite channel sample across 5 feet of clay.

RAW PROPERTIES:

Working properties:	plastic
Water of plasticity:	39.3%
Drying shrinkage:	7.5%
Dry strength:	good
pH:	4.4

SLOW FIRING TEST:

Temp. °C	*Color*	*Hard-ness*	*%Lin. Shk.*	*% Abs.*	*% Appr. Por.*	*Bulk Dens. gm/cc*
1000	Moderate orange	2	10.0	29.3	46.8	1.60
1050	Brownish-orange	2	12.5	28.6	46.6	1.63
1100	Brownish-orange	2	15.0	22.7	40.8	1.80
1150	Strong brown	4	17.5	12.7	27.6	2.18
1200	Strong brown	4	20.0	10.9	24.6	2.26
1250	Strong brown	4	20.0	0.8	22.8	2.33

Remarks: High shrinkage at maturity; no effervescence with HCl.

PRELIMINARY BLOATING TEST: Negative

POTENTIAL USE: Not suitable for structural clay products.

SAMPLE: R-8595 COUNTY: Mecklenburg

DATE: January, 1983 — Tuscaloosa Research Center

LOCALITY: N4,057,620 E742,150 (Zone 17) Baskerville 7.5' quadrangle. Railroad cut, 3.1 miles west of Redlawn, on the east side of an abandoned railroad spur, approximately 0.8 mile by road northeast of its intersection with State Road 615.

DESCRIPTION: Plastic and sandy, mottled very light gray to light olive gray clay, and light brown and dark yellowish-orange to moderate reddish-brown clay are present in a long railroad cut that has a maximum height of 7 feet. The clay material is residuum over the Red Oak Granite; more plastic dark yellowish-orange material occurs near the top and sandy gray clay is present towards the base. Some fragments of quartz are also present in the clay.

FORMATION OR AGE: Residual clay

SAMPLED INTERVAL: Composite channel sample across 6 feet of clay.

RAW PROPERTIES:

Working properties:	plastic
Water of plasticity:	21.3%
Drying shrinkage:	2.5%
Dry strength:	good
pH:	4.6

SLOW FIRING TEST:

Temp. °C	*Color*	*Hard-ness*	*%Lin. Shk.*	*% Abs.*	*% Appr. Por.*	*Bulk Dens. gm/cc*
1000	Moderate orange	2	2.5	20.7	35.5	1.72
1050	Moderate orange	2	2.5	20.3	35.1	1.73
1100	Moderate orange	2	2.5	19.4	33.9	1.75
1150	Moderate orange	2	2.5	18.3	32.4	1.77
1200	Brownish-orange	2	5.0	17.7	31.7	1.79
1250	Brownish-orange	2	5.0	17.2	31.1	1.81

Remarks: Too soft; no effervescence with HCl.

PRELIMINARY BLOATING TEST: Negative

POTENTIAL USE: Not suitable for structural clay products.

SAMPLE: R-8614 COUNTY: Mecklenburg

DATE: March, 1983 — Tuscaloosa Research Center

LOCALITY: N4,061,440 E720,720 (Zone 17) Clarksville North Va. 7.5' quadrangle. Roadcut, 1.5 miles northeast of Jeffress on the southeast side of State Road 701 approximately 0.15 mile by road northeast of its intersection with State Road 863.

DESCRIPTION: Dark yellowish-orange plastic clay is present near the top of a 250-foot-long roadcut that has a maximum height of 8.5 feet. Below this clay is variegated reddish-brown, grayish-red, yellowish-orange and grayish-orange plastic clay. The lower part of the exposure contains white to very pale orange plastic clay with some dark red and white sandy clay mott-lings. Six inches of yellowish-orange silty overburden is present.

FORMATION OR AGE: Residual clay

SAMPLED INTERVAL: Representative channel sample across 8 feet of clay.

RAW PROPERTIES:

Working properties:	plastic
Water of plasticity:	35.7%
Drying shrinkage:	5.0%
Dry strength:	good
pH:	4.2

SLOW FIRING TEST:

Temp. °C	*Color*	*Hard-ness*	*%Lin. Shk.*	*% Abs.*	*% Appr. Por.*	*Bulk Dens. gm/cc*
1000	Moderate orange	3	5.0	24.9	40.0	1.60
1050	Moderate orange	4	7.5	24.9	39.8	1.60
1100	Moderate orange	4	7.5	22.2	37.3	1.68
1150	Moderate orange	4	10.0	16.1	30.4	1.88
1200	Grayish-reddish-orange	4	12.5	7.8	18.9	2.43
1250	—	—	Melted	—	—	—

Remarks: Short firing range, abrupt vitrification between 1150°-1200°C; no effervescence with HCl.

PRELIMINARY BLOATING TEST: Negative

POTENTIAL USE: Marginal for structural clay products (e.g., building brick at 1150°C).

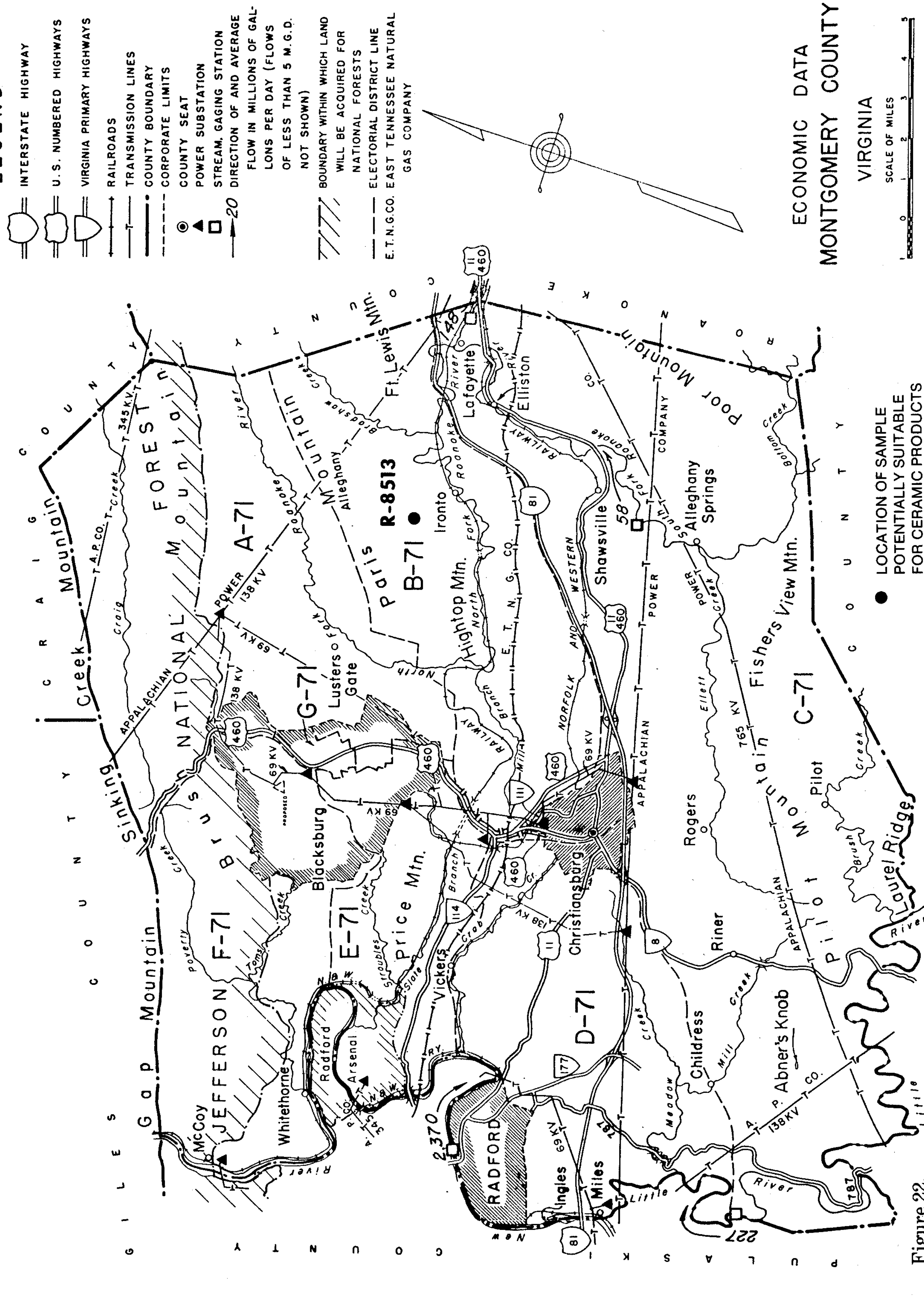

LEGEND
INTERSTATE HIGHWAY
U. S. NUMBERED HIGHWAYS
VIRGINIA PRIMARY HIGHWAYS
RAILROADS
TRANSMISSION LINES
COUNTY BOUNDARY
CORPORATE LIMITS
COUNTY SEAT
POWER SUBSTATION
STREAM, GAGING STATION
DIRECTION OF AND AVERAGE FLOW IN MILLIONS OF GALLONS PER DAY (FLOWS OF LESS THAN 5 M.G.D. NOT SHOWN)
BOUNDARY WITHIN WHICH LAND WILL BE ACQUIRED FOR NATIONAL FORESTS
ELECTORIAL DISTRICT LINE
E. T. N. G. CO. EAST TENNESSEE NATURAL GAS COMPANY
ECONOMIC DATA
MONTGOMERY COUNTY
VIRGINIA
SCALE OF MILES
LOCATION OF SAMPLE POTENTIALLY SUITABLE FOR CERAMIC PRODUCTS
R-8513
A-71
B-71
C-71
D-71
E-71
F-71
G-71
Blacksburg
Christiansburg
RADFORD
Shawsville
Elliston
Lafayette
Ironto
Alleghany Springs
Riner
Rogers
Vickers
Whitethorne
McCoy
Ingles
Miles
Childress
Pilot
Lusters Gate
Radford Arsenal
JEFFERSON NATIONAL FOREST
CRAIG COUNTY
GILES COUNTY
PULASKI COUNTY
FLOYD COUNTY
ROANOKE COUNTY
Brush Mountain
Paris Mountain
Price Mtn.
Hightop Mtn.
Ft. Lewis Mtn.
Poor Mountain
Fishers View Mtn.
Pilot Mountain
Laurel Ridge
P. Abner's Knob
Gap Mountain
Sinking Creek Mountain
New River
Little River

Figure 22.

SAMPLE: R-8513 COUNTY: Montgomery

DATE: January, 1982 — Tuscaloosa Research Center

LOCALITY: N4,120,530 E561,960 (Zone 17) Ironto 7.5' quadrangle. Roadcut, 1.5 miles northwest of Ironto, on the east side of State Road 622 approximately 0.2 mile by road south-southwest of its intersection with State Road 683.

DESCRIPTION: Medium gray and dark gray to black shale is present in a long roadcut that has a maximum height of 15 feet. The shale has an east-west strike and a dip that ranges from 30-60° south. Moderate reddish-brown iron-oxide stain is present on fractures in the shale.

FORMATION OR AGE: Millboro Shale

SAMPLED INTERVAL: Representative composite sample across 15 feet of shale.

RAW PROPERTIES:

Working properties:	short
Water of plasticity:	19.6%
Drying shrinkage:	2.5%
Dry strength:	fair
pH:	6.4

SLOW FIRING TEST:

Temp. °C	*Color*	*Hard-ness*	*%Lin. Shk.*	*% Abs.*	*% Appr. Por.*	*Bulk Dens. gm/cc*
1000	Moderate orange	3	5.0	14.4	27.8	1.93
1050	Pale orangish-yellow	4	5.0	16.9	30.6	1.81
1100	Moderate orangish-yellow	5	5.0	12.4	24.0	1.94
1150	Strong yellowish-brown	6	7.5	6.6	13.9	2.13
1200	Light brown	6	7.5	4.3	9.2	2.13
1250	—	—	Melted	—	—	—

Remarks: Good firing range; no effervescence with HCl.

PRELIMINARY BLOATING TEST: Negative

POTENTIAL USE: Structural clay products (e.g., building brick at 1050°-1200°C).

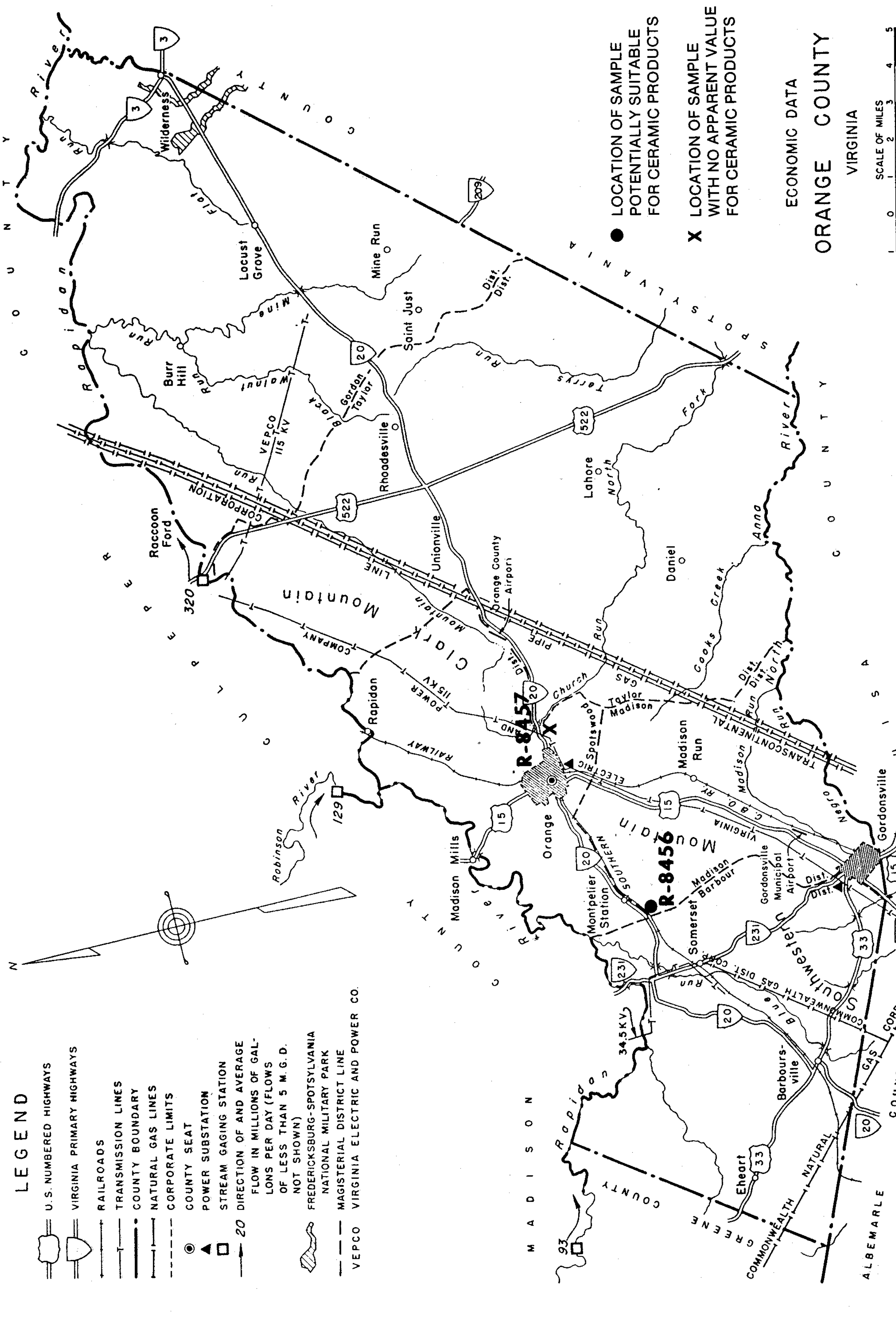

LEGEND
U.S. NUMBERED HIGHWAYS
VIRGINIA PRIMARY HIGHWAYS
RAILROADS
TRANSMISSION LINES
COUNTY BOUNDARY
NATURAL GAS LINES
CORPORATE LIMITS
COUNTY SEAT
POWER SUBSTATION
STREAM GAGING STATION
DIRECTION OF AND AVERAGE FLOW IN MILLIONS OF GALLONS PER DAY (FLOWS OF LESS THAN 5 M.G.D. NOT SHOWN)
FREDERICKSBURG-SPOTSYLVANIA NATIONAL MILITARY PARK
MAGISTERIAL DISTRICT LINE
VEPCO VIRGINIA ELECTRIC AND POWER CO.
LOCATION OF SAMPLE POTENTIALLY SUITABLE FOR CERAMIC PRODUCTS
LOCATION OF SAMPLE WITH NO APPARENT VALUE FOR CERAMIC PRODUCTS
ECONOMIC DATA
ORANGE COUNTY
VIRGINIA
SCALE OF MILES
0 1 2 3 4 5
R-8457
R-8456
Orange
Gordonsville
Wilderness
Locust Grove
Mine Run
Saint Just
Burr Hill
Rhoadesville
Raccoon Ford
Unionville
Orange County Airport
Lahore
Daniel
Rapidan
Madison Mills
Madison Run
Montpelier Station
Somerset
Gordonsville Municipal Airport
Barboursville
Eheart
Clark Mountain
Southwest Mountain
CULPEPER COUNTY
SPOTSYLVANIA COUNTY
LOUISA COUNTY
ALBEMARLE COUNTY
GREENE COUNTY
MADISON COUNTY
Rapidan River
North Anna River
Robinson River
TRANSCONTINENTAL GAS PIPE LINE CORPORATION
COMMONWEALTH NATURAL GAS CORPORATION
SOUTHERN RAILWAY
C. & O. RY.

Figure 23.

SAMPLE: R-8456 COUNTY: Orange

DATE: June, 1981 — Tuscaloosa Research Center

LOCALITY: N4,234,090 E746,320 (Zone 17) Gordonsville 7.5' quadrangle. Roadcut, 0.7 mile southwest of Montpelier Station, on the southeast side of Virginia Highway 20 approximately 0.2 mile by road northeast of its intersection with State Road 639.

DESCRIPTION: Pale reddish-brown and grayish-red silty clay and mudstone are present in a 250-foot-long roadcut that has a maximum height of 7 feet.

FORMATION OR AGE: Residual clay

SAMPLED INTERVAL: Representative sample of clay and mudstone in the exposure.

RAW PROPERTIES:

Working properties:	short
Water of plasticity:	15.3%
Drying shrinkage:	5.0%
Dry strength:	fair
pH:	4.0

SLOW FIRING TEST:

Temp. °C	*Color*	*Hard-ness*	*%Lin. Shk.*	*% Abs.*	*% Appr. Por.*	*Bulk Dens. gm/cc*
1000	Moderate orange	3	5.0	22.1	38.6	1.74
1050	Deep orange	3	7.5	18.7	34.7	1.85
1100	Brownish-orange	5	10.0	13.2	27.2	2.06
1150	Brownish-orange	6	10.0	11.1	23.7	2.13
1200	Strong brown	6	12.5	9.5	20.8	2.19
1250	Strong brown	6	12.5	7.3	16.7	2.28

Remarks: Slightly high shrinkage at 1200°-1250°C; no effervescence with HCl.

PRELIMINARY BLOATING TEST: Negative

POTENTIAL USE: Structural clay products (e.g., building brick at 1100°-1250°C).

SAMPLE: R-8457 COUNTY: Orange

DATE: June, 1981 — Tuscaloosa Research Center

LOCALITY: N4,236,650 E754,700 (Zone 17) Orange 7.5' quadrangle. Roadcut, 1.1 miles east of Orange, on the south side of Virginia Highway 20 approximately 0.35 mile by road west of its crossing over Black Run.

DESCRIPTION: Dark reddish-brown plastic clay and some yellowish-orange silty clay are present in a long roadcut that has a maximum height of 10 feet. Some greenstone and quartz granules and pebbles are present in the clay in parts of the roadcut.

FORMATION OR AGE: Residual clay

SAMPLED INTERVAL: Representative sample of clay in the exposure.

RAW PROPERTIES:

Working properties:	plastic
Water of plasticity:	37.4%
Drying shrinkage:	5.0%
Dry strength:	good
pH:	4.0

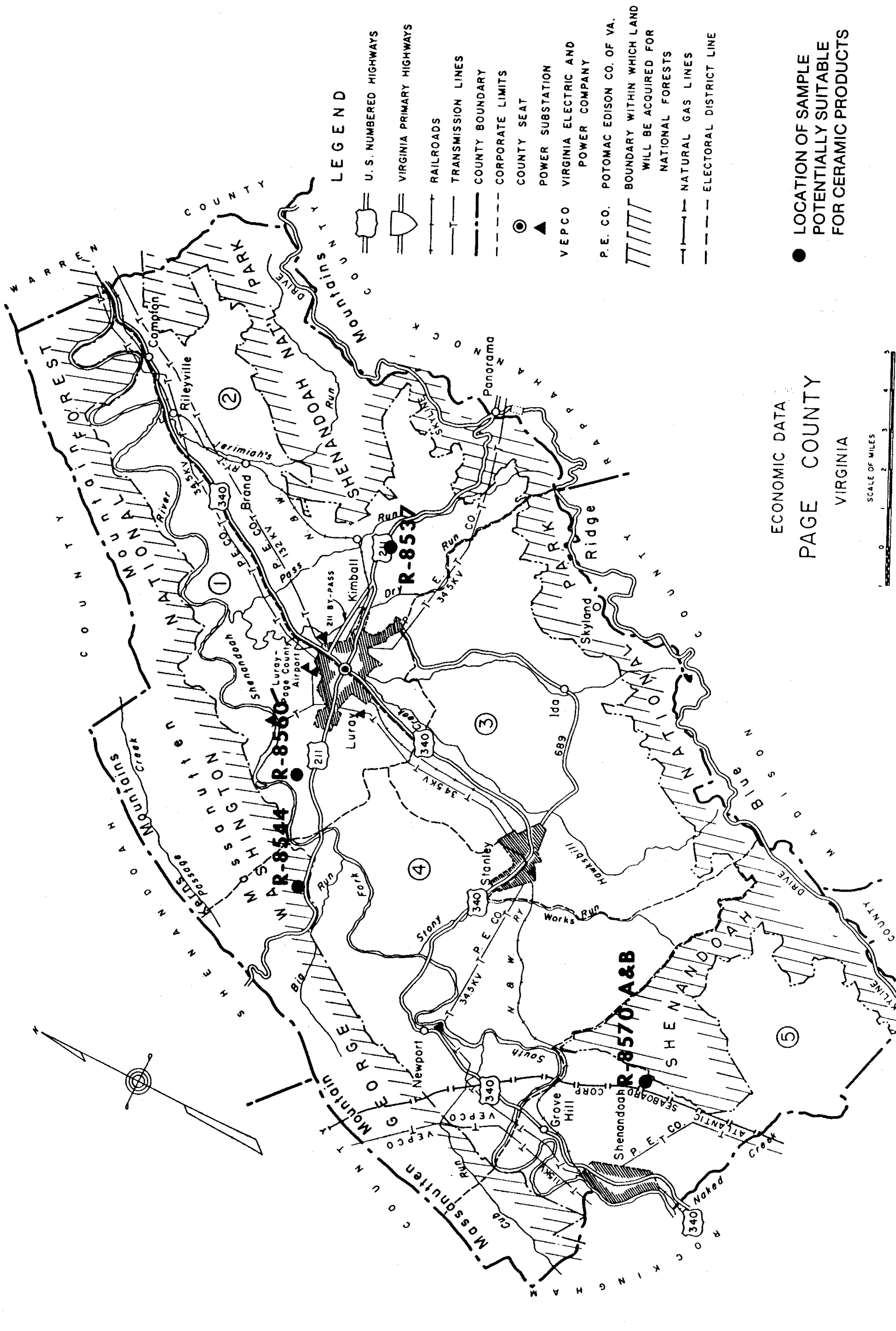
SLOW FIRING TEST:

Temp. °C	*Color*	*Hard-ness*	*%Lin. Shk.*	*% Abs.*	*% Appr. Por.*	*Bulk Dens. gm/cc*
1000	Moderate orange	3	7.5	25.4	43.4	1.71
1050	Brownish-orange	5	10.0	23.0	41.1	1.79
1100	Strong brown	6	15.0	13.0	28.3	2.17
1150	Strong brown	6	15.0	6.5	16.1	2.48
1200	Strong brown	6	17.5	5.2	13.3	2.57
1250	Moderate reddish-brown	6	20.0	3.8	10.0	2.62

Remarks: High shrinkage; no effervescence with HCl.

PRELIMINARY BLOATING TEST: Negative

POTENTIAL USE: Not suitable for structural clay products.



LEGEND
U. S. NUMBERED HIGHWAYS
VIRGINIA PRIMARY HIGHWAYS
RAILROADS
TRANSMISSION LINES
COUNTY BOUNDARY
CORPORATE LIMITS
COUNTY SEAT
POWER SUBSTATION
VEPCO VIRGINIA ELECTRIC AND POWER COMPANY
P. E. CO. POTOMAC EDISON CO. OF VA.
BOUNDARY WITHIN WHICH LAND WILL BE ACQUIRED FOR NATIONAL FORESTS
NATURAL GAS LINES
ELECTORAL DISTRICT LINE
LOCATION OF SAMPLE POTENTIALLY SUITABLE FOR CERAMIC PRODUCTS
ECONOMIC DATA
PAGE COUNTY
VIRGINIA
SCALE OF MILES
R-8537
R-8560
R-8544
R-8570 A&B
Luray
Stanley
Shenandoah
Grove Hill
Newport
Ida
Kimball
Brand
Rileyville
Compton
Panorama
Skyland
Luray-Page County Airport
WARREN COUNTY
SHENANDOAH COUNTY
ROCKINGHAM COUNTY
GREENE COUNTY
MADISON COUNTY
RAPPAHANNOCK COUNTY
SHENANDOAH NATIONAL PARK
MASSANUTTEN MOUNTAIN

Figure 24.

SAMPLE: R-8537 COUNTY: Page

DATE: August, 1982 — Tuscaloosa Research Center

LOCALITY: N4,283,540 E726,300 (Zone 17) Luray 7.5' quadrangle. Roadcut, 3.4 miles east of Luray on the east side of State Road 611 just south of its intersection with U.S. Highway 211.

DESCRIPTION: Dark reddish-brown plastic clay, with bits of pale, reddish-brown shale, is present in a 75-foot-long roadcut that has a maximum height of 4 feet. Mottled reddish-orange, pale to dark yellowish-orange and pale olive plastic clay is also present. Three and one-half feet of additional mottled reddish-orange and brown plastic clay was indicated by augering to that depth at the base of the exposure. Some sub-rounded quartz pebbles were noted in the clay at the base of the exposure. The exposure probably consists of some flood-plain material and residuum over the Rome Formation; one foot of loamy, brown overburden is present.

FORMATION OR AGE: Residual clay

SAMPLED INTERVAL: Channel sample across 3 feet of clay and 3.5 feet of augured clay.

RAW PROPERTIES:

Working properties:	plastic
Water of plasticity:	33.1%
Drying shrinkage:	5.0%
Dry strength:	good
pH:	4.6

SLOW FIRING TEST:

Temp. °C	*Color*	*Hard-ness*	*%Lin. Shk.*	*% Abs.*	*% Appr. Por.*	*Bulk Dens. gm/cc*
1000	Moderate orange	3	10.0	23.5	39.9	1.70
1050	Moderate orange	4	10.0	21.3	37.4	1.76
1100	Brownish-orange	4	12.5	13.1	26.8	2.05
1150	Brownish-orange	4	12.5	12.0	24.9	2.07
1200	Brownish-orange	4	12.5	11.8	24.7	2.09
1250	Strong brown	4	12.5	11.8	24.7	2.09

Remarks: Slightly high shrinkage at 1100°-1250°C.; no effervescence with HCl.

PRELIMINARY BLOATING TEST: Negative

POTENTIAL USE: Structural clay products (e.g., building brick at 1050°-1250°C).

SAMPLE: R-8544 COUNTY: Page

DATE: August, 1982 — Tuscaloosa Research Center

LOCALITY: N4,279,660 E712,110 (Zone 17) Hamburg 7.5' quadrangle. Quarry, 5.5 miles north of Stanley, off the north side of U. S. Highway 211 approximately 0.8 mile by road west-southwest of its intersection with State Road 615.

DESCRIPTION: Light olive gray shale, with some thin interbeds of siltstone, is present in an abandoned quarry where the material has a northeast-southwest strike in a small syn-cline. Weathered surfaces are grayish-orange. Dark yellowish-brown stain is present along some of the bedding.

FORMATION OR AGE: Martinsburg Formation

SAMPLED INTERVAL: Representative sample across 25 feet of shale.

RAW PROPERTIES:

Working properties:	plastic
Water of plasticity:	23.2%
Drying shrinkage:	5.0%
Dry strength:	good
pH:	6.0

SLOW FIRING TEST:

Temp. °C	*Color*	*Hard-ness*	*%Lin. Shk.*	*% Abs.*	*% Appr. Por.*	*Bulk Dens. gm/cc*
1000	Moderate orange	3	5.0	19.2	34.1	1.78
1050	Brownish-orange	4	7.5	14.4	27.6	1.91
1100	Strong brown	6	10.0	5.2	11.8	2.25
1150	Strong brown	6	10.0	2.7	6.3	2.32
1200	—	—	Melted	—	—	—
1250	—	—	—	—	—	—

Remarks: Short firing range; abrupt vitrification between 1050°-1100°C.; no effervescence with HCl.

PRELIMINARY BLOATING TEST: Negative

POTENTIAL USE: Structural clay products (e.g., building brick at 1050°C).

SAMPLE: R-8560 COUNTY: Page

DATE: August, 1982 — Tuscaloosa Research Center

LOCALITY: N4,282,530 E716,780 (Zone 17) Hamburg 7.5' quadrangle. Ditchcut, 2.6 miles west of Luray, on the southeast side of State Road 647 approximately 0.3 mile by road east of its intersection with State Road 645.

DESCRIPTION: Dark yellowish-orange plastic clay and mottled pale red, moderate-dark reddish-brown and yellowish-gray plastic clay are present in a short ditch that has a depth of about 1 foot. Fragments of gray limestone were encountered at the base of a 1.5 foot auger hole.

FORMATION OR AGE: Transported clay

SAMPLED INTERVAL: Representative channel sample across approximately 1 foot of clay exposed and 1.5 feet of additional augered clay.

RAW PROPERTIES:

Working properties:	plastic
Water of plasticity:	33.2%
Drying shrinkage:	7.5%
Dry strength:	good
pH:	4.1

SLOW FIRING TEST:

Temp. °C	*Color*	*Hard-ness*	*%Lin. Shk.*	*% Abs.*	*% Appr. Por.*	*Bulk Dens. gm/cc*
1000	Moderate orange	5	10.0	16.9	31.3	1.85
1050	Moderate orange	6	12.5	13.1	25.8	1.97
1100	Moderate orange	6	15.0	5.2	11.6	2.23
1150	Brownish-orange	6	15.0	2.7	6.3	2.30
1200	Light brown	6	15.0	1.4	3.3	2.31
1250	Grayish-brown	6	15.0	1.2	2.7	2.31

Remarks: Abrupt vitrification between 1050°-1100 C; high shrinkage at 1100°-1250°C; no effervescence with HCl.

PRELIMINARY BLOATING TEST: Negative

POTENTIAL USE: Structural clay products (e.g., building brick at 1000°-1050°C).

SAMPLE: R-8570-A and R-8570-B COUNTY: Page

DATE: October, 1982 — Tuscaloosa Research Center

LOCALITY: N4,263,470 E711,930 (Zone 17) Elkton East 7.5' quadrangle. Pit (Smith Bank mine) 3.0 miles southeast of Grove Hill and 0.45 mile northeast of State Road 608.

R-8570-A

DESCRIPTION: Pale to dark yellowish-orange soft shale and plastic clay are present in the pit wall of the old Smith Bank mine. Minor amounts of white to cream clay are present near the base of the unit and iron-oxide staining is more prevalent in the top of the pit wall.

FORMATION OR AGE: Rome Formation

SAMPLED INTERVAL: Representative channel sample across 10 feet of leached shale saprolite and clay.

RAW PROPERTIES:

Working properties:	plastic
Water of plasticity:	32.8%
Drying shrinkage:	5.0%
Dry strength:	good
pH:	4.8

SLOW FIRING TEST:

Temp. °C	*Color*	*Hard-ness*	*%Lin. Shk.*	*% Abs.*	*% Appr. Por.*	*Bulk Dens. gm/cc*
1000	Moderate orange	3	7.5	23.9	41.3	1.73
1050	Moderate orange	5	10.0	19.1	35.9	1.88
1100	Brownish-orange	5	15.0	9.6	21.6	2.26
1150	Grayish-reddish-orange	5	15.0	7.3	17.1	2.35
1200	Strong brown	6	17.5	3.7	9.3	2.50
1250	Moderate reddish-brown	6	17.5	1.9	4.8	2.58

Remarks: Short firing range; high shrinkage above 1050°C; no effervescence with HCl.

PRELIMINARY BLOATING TEST: Negative

POTENTIAL USE: Structural clay products (e.g., building brick at 1050°C).

R-8570-B

DESCRIPTION: White residuum over the leached Rome Formation is present in the pit wall of the old Smith Bank mine. The material is white, with some hard fragments of underlying dolomite and some yellowish-orange stain.

FORMATION OR AGE: Leached shale of Rome Formation.

SAMPLED INTERVAL: Representative sample across 5 feet of clayey material.

RAW PROPERTIES:

Working properties:	plastic
Water of plasticity:	31.3%
Drying shrinkage:	2.5%
Dry strength:	good
pH:	4.8

SLOW FIRING TEST:

Temp. °C	*Color*	*Hard-ness*	*%Lin. Shk.*	*% Abs.*	*% Appr. Por.*	*Bulk Dens. gm/cc*
1000	White	4	5.0	20.0	33.8	1.69
1050	White	5	10.0	15.3	28.2	1.84
1100	White	6	12.5	5.0	10.9	2.17
1150	Pale yellow	6	12.5	0.9	2.1	2.39
1200	—	—	Melted	—	—	—
1250	—	—	—	—	—	—

Remarks: Abrupt vitrification between 1050°-1100°C; no effervescence with HCl.

PRELIMINARY BLOATING TEST: Negative

REFLECTANCE TESTS: Brightness 85.5; tint 3.5; whiteness 71.5

POTENTIAL USE: Structural clay products (e.g., building brick, structural tile, at 1000°-1050°C).

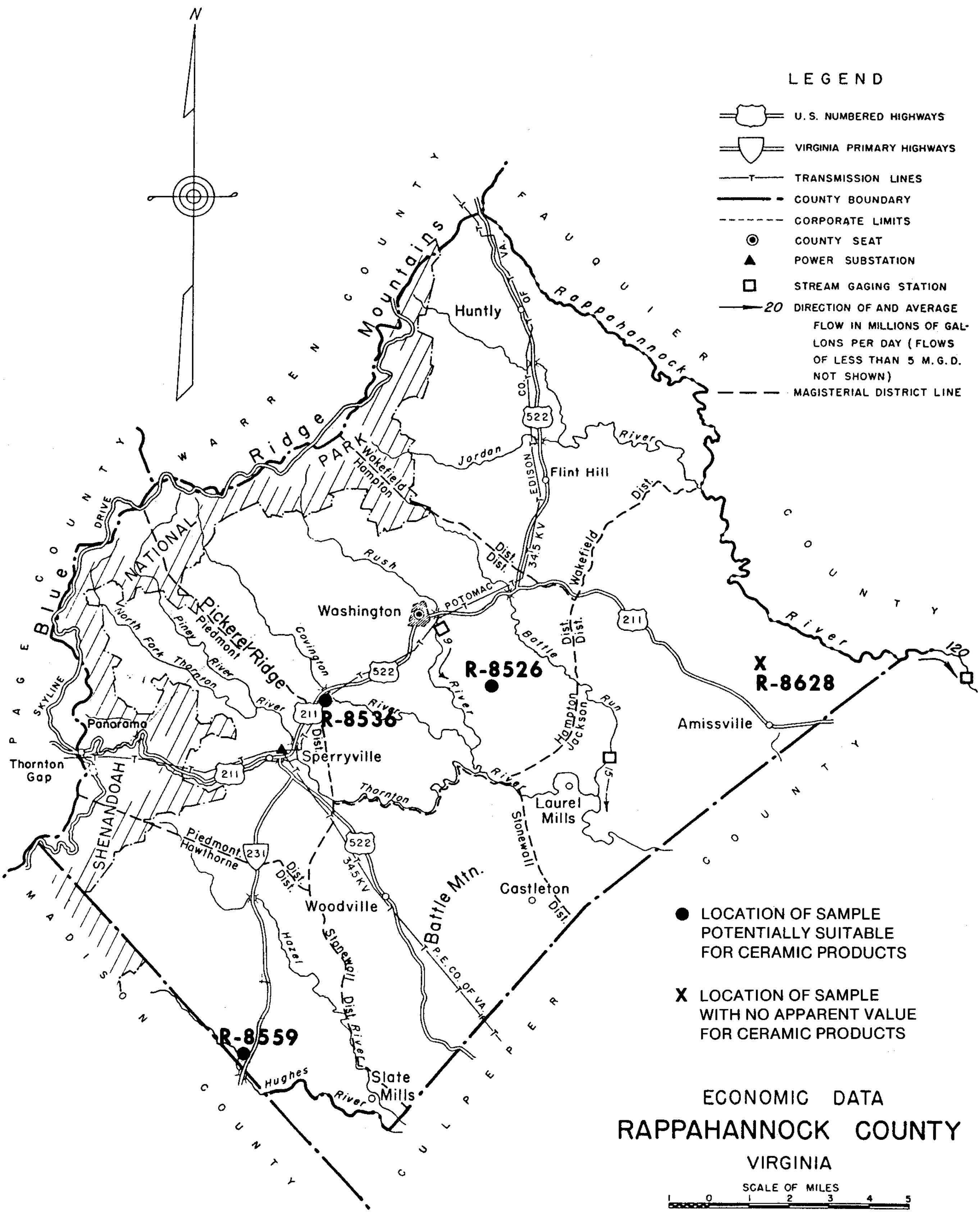

N
LEGEND
U. S. NUMBERED HIGHWAYS
VIRGINIA PRIMARY HIGHWAYS
TRANSMISSION LINES
COUNTY BOUNDARY
CORPORATE LIMITS
COUNTY SEAT
POWER SUBSTATION
STREAM GAGING STATION
20 DIRECTION OF AND AVERAGE FLOW IN MILLIONS OF GALLONS PER DAY (FLOWS OF LESS THAN 5 M.G.D. NOT SHOWN)
MAGISTERIAL DISTRICT LINE
WARREN COUNTY
FAUQUIER COUNTY
PAGE COUNTY
MADISON COUNTY
CULPEPER COUNTY
Blue Ridge Mountains
SHENANDOAH NATIONAL PARK
Pickerel Ridge
SKYLINE DRIVE
Rappahannock River
Huntly
Flint Hill
Washington
Sperryville
Panorama
Thornton Gap
Amissville
Laurel Mills
Castleton
Woodville
Slate Mills
Battle Mtn.
Jordan River
Rush River
Covington River
Thornton River
North Fork Thornton River
Piney River
Battle Run
Hazel River
Hughes River
Run
POTOMAC
EDISON CO. OF VA.
34.5 KV
P.E. CO. OF VA.
Wakefield Hampton Dist.
Piedmont Hawthorne Dist.
Hampton Jackson Dist.
Stonewall Dist.
522
211
231
R-8526
R-8536
R-8559
R-8628
LOCATION OF SAMPLE POTENTIALLY SUITABLE FOR CERAMIC PRODUCTS
LOCATION OF SAMPLE WITH NO APPARENT VALUE FOR CERAMIC PRODUCTS
ECONOMIC DATA
RAPPAHANNOCK COUNTY
VIRGINIA
SCALE OF MILES
1 0 1 2 3 4 5

Figure 25.

SAMPLE: R-8526 COUNTY: Rappahannock

DATE: June, 1982 — Tuscaloosa Research Center

LOCALITY: N4,284,890 E749,890 (Zone 17) Washington 7.5' quadrangle. Roadcut, 2.9 miles southeast of Washington, on the east side of State Road 626 approximately 0.4 mile by road south of its intersection with State Road 627.

DESCRIPTION: Dark to moderate reddish-brown plastic clay is present in a 170-foot-long roadcut that has a maximum height of 5.5 feet. The clay is residuum over rocks mapped as augen gneiss. Some dusky yellow to light olive brown weathered schist is present in the southern end of the exposure.

FORMATION OR AGE: Residual clay

SAMPLED INTERVAL: Composite channel sample across 5.5 feet of clay

RAW PROPERTIES:

Working properties:	plastic
Water of plasticity:	29.6%
Drying shrinkage:	2.5%
Dry strength:	good
pH:	4.2

SLOW FIRING TEST:

Temp. °C	*Color*	*Hard-ness*	*%Lin. Shk.*	*% Abs.*	*% Appr. Por.*	*Bulk Dens. gm/cc*
1000	Moderate orange	3	7.5	26.0	42.8	1.65
1050	Brownish-orange	3	7.5	22.5	39.2	1.74
1100	Brownish-orange	4	10.0	15.7	30.7	1.96
1150	Brownish-orange	4	10.0	15.2	30.2	1.99
1200	Strong brown	4	10.0	11.9	25.0	2.10
1250	Strong brown	4	12.5	10.5	22.4	2.15

Remarks: Slightly high shrinkage at 1250°C; no effervescence with HCl.

PRELIMINARY BLOATING TEST: Negative

POTENTIAL USE: Structural clay products (e.g., building brick at 1100°-1250°C).

SAMPLE: R-8536 COUNTY: Rappahannock

DATE: August, 1982 — Tuscaloosa Research Center

LOCALITY: N4,284,950 E743,070 (Zone 17) Washington 7.5' quadrangle. Roadcut, 2 miles northeast of Sperryville on the southeast side of U. S. Highway 522 approximately 0.15 mile by road southwest of its intersection with State Road 622 leading northwest.

DESCRIPTION: Moderate to dark reddish-brown plastic clay is present in a 300-foot-long roadcut that has a maximum height of 5.5 feet. Some dark yellowish-orange silty clay is also present as well as a feldspar granite saprolite near the base of the exposure. The saprolite was not included in the sample.

FORMATION OR AGE: Residual clay

SAMPLED INTERVAL: Channel sample across 5 feet of clay.

RAW PROPERTIES:

Working properties:	plastic
Water of plasticity:	34.0%
Drying shrinkage:	5.0%
Dry strength:	good
pH:	4.3

SLOW FIRING TEST:

Temp. °C	*Color*	*Hard-ness*	*%Lin. Shk.*	*% Abs.*	*% Appr. Por.*	*Bulk Dens. gm/cc*
1000	Moderate orange	3	7.5	25.9	41.4	1.58
1050	Strong orange	3	7.5	25.9	41.1	1.60
1100	Strong orange	4	10.0	19.6	34.9	1.78
1150	Moderate orange	4	12.5	16.9	31.4	1.86
1200	Brownish-orange	4	12.5	15.7	30.0	1.91
1250	Brownish-orange	4	12.5	15.2	29.0	1.92

Remarks: Slightly high shrinkage at 1150°-1250°C; no effervescence with HCl.

PRELIMINARY BLOATING TEST: Negative

POTENTIAL USE: Structural clay products (e.g., building brick at 1100°-1250°C).

SAMPLE: R-8559 COUNTY: Rappahannock

DATE: August, 1982 — Tuscaloosa Research Center

LOCALITY: N4,270,030 E740,550 (Zone 17) Woodville 7.5' quadrangle. Roadcut, 2.8 miles west of Slate Mills, on the west side of Virginia Highway 231, about 350 feet by road north of its intersection with State Road 601.

DESCRIPTION: Medium reddish-brown gritty clay is present in a long covered roadcut that has a maximum height of 9 feet. Country rock in the area is probably biotite gneiss and graphitic schist. Fragments of quartz and pieces of graphite are present in the exposure.

FORMATION OR AGE: Residual clay

SAMPLED INTERVAL: Representative sample across 8 feet of clay.

RAW PROPERTIES:

Working properties:	plastic
Water of plasticity:	30.6%
Drying shrinkage:	5.0%
Dry strength:	good
pH:	4.4

SLOW FIRING TEST:

Temp. °C	*Color*	*Hard-ness*	*%Lin. Shk.*	*% Abs.*	*% Appr. Por.*	*Bulk Dens. gm/cc*
1000	Moderate orange	3	5.0	25.0	41.2	1.65
1050	Strong orange	3	7.5	23.5	39.7	1.69
1100	Brownish-orange	3	12.5	14.8	29.0	1.96
1150	Brownish-orange	3	12.5	14.4	28.5	1.99
1200	Strong brown	4	12.5	13.9	27.7	2.00
1250	Moderate reddish-brown	4	12.5	13.6	27.4	2.01

Remarks: Slightly high shrinkage at 1200°-1250°C; no effervescence with HCl.

PRELIMINARY BLOATING TEST: Negative

POTENTIAL USE: Structural clay products (e.g., building brick at 1200°-1250°C).

SAMPLE: R-8628 COUNTY: Rappahannock

DATE: July, 1983 — Tuscaloosa Research Center

LOCALITY: N4,287,300 E760,040 (Zone 17) Massies Corner 7.5' quadrangle. Roadcut, 1.3 miles north of Amissville, on the east side of State Road 645, approximately 0.6 mile by road north-northeast of its intersection with State Road 637.

DESCRIPTION: Light brown to moderate reddish-brown plastic to silty clay is present in a 180-foot-long roadcut that has a maximum height of 5 feet. The clay becomes more silty towards the base of the exposure.

FORMATION OR AGE: Residual clay

SAMPLED INTERVAL: Representative channel sample across 4 feet of clay.

RAW PROPERTIES:

Working properties:	plastic
Water of plasticity:	46.4%
Drying shrinkage:	7.5%
Dry strength:	good
pH:	5.3

SLOW FIRING TEST:

Temp. °C	*Color*	*Hard-ness*	*%Lin. Shk.*	*% Abs.*	*% Appr. Por.*	*Bulk Dens. gm/cc*
1000	Deep orange	3	10.0	28.4	45.3	1.59
1000	Deep orange	3	12.5	25.1	42.7	1.70
1100	Brownish-orange	3	15.0	9.0	20.8	2.32
1150	Brownish-orange	6	20.0	7.3	17.3	2.38
1200	Strong brown	6	20.0	4.9	12.0	2.48
1250	Strong brown	6	22.5	3.9	9.7	2.52

Remarks: High shrinkage at maturity; no effervescence with HCl.

PRELIMINARY BLOATING TEST: Negative

POTENTIAL USE: Not suitable for structural clay products.

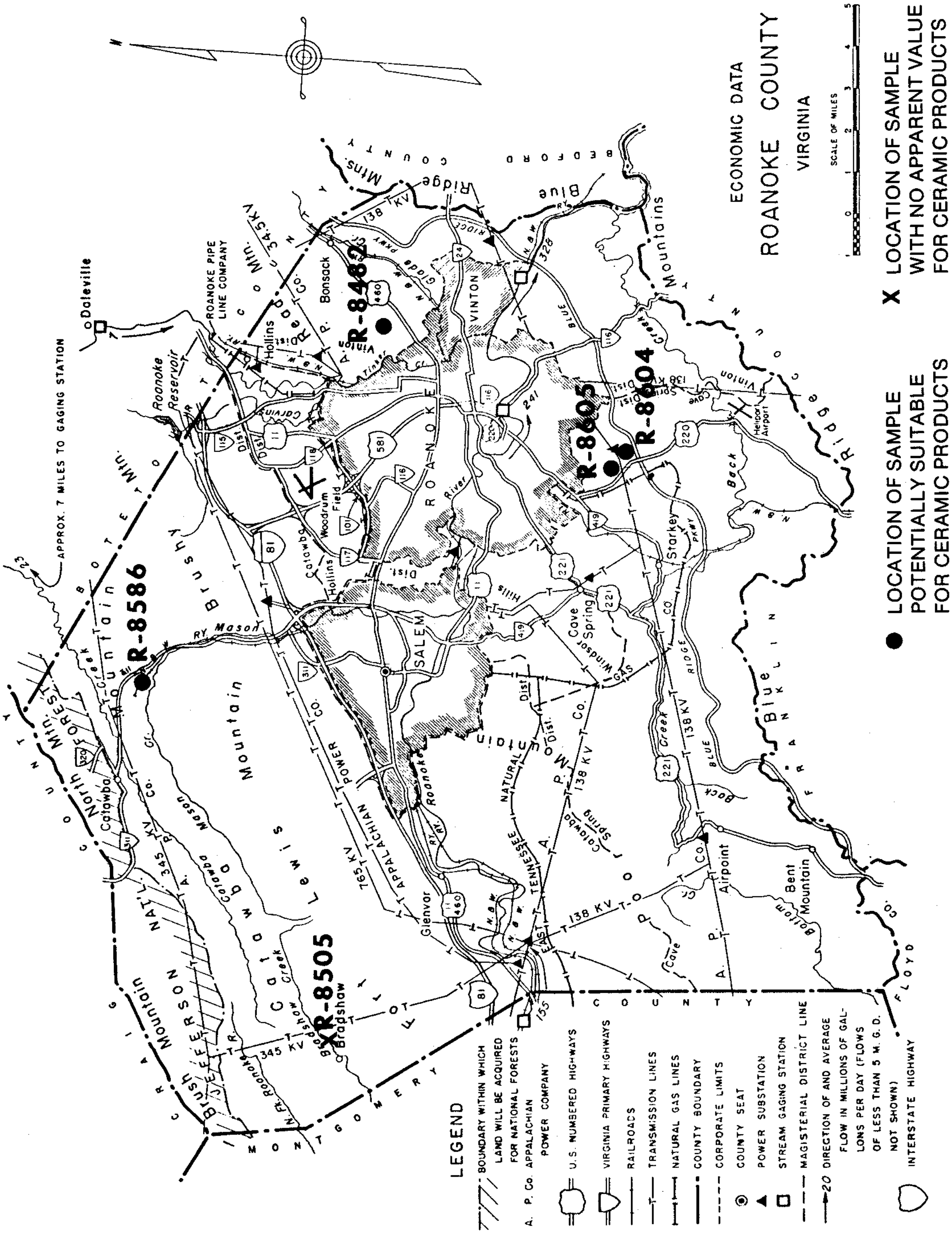

ECONOMIC DATA
ROANOKE COUNTY
VIRGINIA
SCALE OF MILES
● LOCATION OF SAMPLE POTENTIALLY SUITABLE FOR CERAMIC PRODUCTS
X LOCATION OF SAMPLE WITH NO APPARENT VALUE FOR CERAMIC PRODUCTS
LEGEND
BOUNDARY WITHIN WHICH LAND WILL BE ACQUIRED FOR NATIONAL FORESTS
A. P. Co. APPALACHIAN POWER COMPANY
U.S. NUMBERED HIGHWAYS
VIRGINIA PRIMARY HIGHWAYS
RAILROADS
TRANSMISSION LINES
NATURAL GAS LINES
COUNTY BOUNDARY
CORPORATE LIMITS
COUNTY SEAT
POWER SUBSTATION
STREAM GAGING STATION
MAGISTERIAL DISTRICT LINE
20 DIRECTION OF AND AVERAGE FLOW IN MILLIONS OF GALLONS PER DAY (FLOWS OF LESS THAN 5 M. G. D. NOT SHOWN)
INTERSTATE HIGHWAY
R-8586
R-8505
R-8482
R-8605
R-8604
APPROX. 7 MILES TO GAGING STATION
Daleville
Roanoke Reservoir
ROANOKE PIPE LINE COMPANY
SALEM
VINTON
Bonsack
Hollins
Catawba
Woodrum Field
Glenvor
Cave Spring
Starkey
Bent Mountain
Airpoint
Bradshaw
Mason
Roanoke River
765 KV
345 KV
138 KV
MONTGOMERY
FLOYD
FRANKLIN
BEDFORD
BOTETOURT
CRAIG
COUNTY

Figure 26.

SAMPLE: R-8482 COUNTY: Roanoke

DATE: October, 1981 — Tuscaloosa Research Center

LOCALITY: N4,131,610 E597,430 (Zone 17) Roanoke 7.5' quadrangle. Roadcut, 2.8 miles southeast of Hollins, on the west side of State Road 610 extended (Coachman Circle)approximately 1.5 miles by road northwest of its intersection with U. S. Highway 460.

DESCRIPTION: Grayish-orange to dark yellowish-orange shale and clay are present in a 200-foot-long roadcut that has a maximum height of 8 feet. The material becomes mottled with moderate red-brown and pinkish-gray to light gray clay and bits of shale toward the top of the exposure. The shale has a strike of approximately N40°E and an approximate vertical dip. The top of the shale exposure is close to the contact with an iron-manganese stained sandstone.

FORMATION OR AGE: Devonian

SAMPLED INTERVAL: Composite of representative samples across 50+ feet of shale and clay.

RAW PROPERTIES:

Working properties:	plastic
Water of plasticity:	26.9%
Drying shrinkage:	5.0%
Dry strength:	good
pH:	3.7

SLOW FIRING TEST:

Temp. °C	*Color*	*Hard-ness*	*%Lin. Shk.*	*% Abs.*	*% Appr. Por.*	*Bulk Dens. gm/cc*
1000	Moderate orange	3	5.0	19.1	34.2	1.79
1050	Moderate orange	5	7.5	13.3	26.2	1.98
1100	Brownish-orange	6	10.0	4.6	10.6	2.29
1150	Strong brown	7	12.5	1.1	2.7	2.46
1200	—	—	—	Melted	—	—
1250	—	—	—	—	—	—

Remarks: Abrupt vitrification between 1050-1100°C; no effervescence with HCl.

PRELIMINARY BLOATING TEST: Negative

POTENTIAL USE: Structural clay products (e.g., building brick at 1050°C).

SAMPLE: R-8505 COUNTY: Roanoke

DATE: January, 1982 — Tuscaloosa Research Center

LOCALITY: N4,129,020 E569,380 (Zone 17) Glenvar 7.5' quadrangle. Roadcut, 0.7 mile northeast of Bradshaw, off the northwest side of State Road 622 approximately 0.8 mile by road northeast of its intersection with State Road 727.

DESCRIPTION: Brownish-black to black paper-thin hard shale is present in a long roadcut that has a maximum height of 25 feet. The shale has a strike of N50°E and a dip of 30°SE; joints in the shale strike N80°E and also N-S. The shale has manganese (?) coating on some beds and appears to have little plasticity.

FORMATION OR AGE: Devonian

SAMPLED INTERVAL: Representative composite sample across 15 feet of shale.

RAW PROPERTIES:

Working properties:	short
Water of plasticity:	18.6%
Drying shrinkage:	2.5%
Dry strength:	fair
pH:	5.4

SLOW FIRING TEST:

Temp. °C	*Color*	*Hard-ness*	*%Lin. Shk.*	*% Abs.*	*% Appr. Por.*	*Bulk Dens. gm/cc*
1000	Moderate orange	3	2.5	18.1	32.4	1.79
1050	Moderate orange	3	5.0	14.0	27.0	1.93
1100	Grayish-reddish-orange	5	12.5	8.7	20.2	2.33
1150	—	—	Melted	—	—	—
1200	—	—	—	—	—	—
1250	—	—	—	—	—	—

Remarks: Abrupt vitrification between 1100°-1150°C; no effervescence with HCl.

PRELIMINARY BLOATING TEST: Negative

POTENTIAL USE: Not suitable for structural clay products.

SAMPLE: R-8586 COUNTY: Roanoke

DATE: January, 1983 — Tuscaloosa Research Center

LOCALITY: N4,136,720 E582,510 (Zone 17) Catawba 7.5' quadrangle. Roadcut, 2.3 miles east-southeast of Catawba, on the southwest and northeast sides of State Road 890 at its intersection with State Road 864.

DESCRIPTION: Dark brown to dusky brown and dark gray fissile shale is present in a shallow roadcut. Some pale yellowish-orange clay residuum dusting is present on the shale which has some reddish-brown and orange iron oxide staining along bedding and jointing. The material appears to be sheared in places and has a strike of N60°E with a dip ranging between 40-60° southeast. The dip steepens to the southeast and flattens to the northwest.

FORMATION OR AGE: Needmore Shale

SAMPLED INTERVAL: Composite of representative samples taken across 15 feet of shale.

RAW PROPERTIES:

Working properties:	plastic
Water of plasticity:	21.4%
Drying shrinkage:	2.5%
Dry strength:	good
pH:	6.1

SLOW FIRING TEST:

Temp. °C	*Color*	*Hard-ness*	*%Lin. Shk.*	*% Abs.*	*% Appr. Por.*	*Bulk Dens. gm/cc*
1000	Moderate yellowish-pink	3	2.5	20.9	35.7	1.71
1050	Moderate yellowish-pink	4	5.0	16.4	30.2	1.85
1100	Grayish-reddish-orange	5	7.5	10.4	21.4	2.05
1150	Moderate reddish-brown	6	7.5	6.0	13.3	2.19
1200	Moderate reddish-brown	6	7.5	3.1	7.0	2.21
1250	—	—	Melted	—	—	—

Remarks: Good firing range; no effervescence with HCl.

PRELIMINARY BLOATING TEST: Negative

POTENTIAL USE: Structural clay products (e.g., building brick at 1050-1200°C).

SAMPLE: R-8604 COUNTY: Roanoke

DATE: January, 1983 — Tuscaloosa Research Center

LOCALITY: N4,119,110 E592,250 (Zone 17) Garden City 7.5' quadrangle. Hillside cut, 2.3 miles south of Roanoke, 200 feet off the northeast side of U. S. Highway 220 approximately 0.45 mile by road southeast of its intersection with State Road 789 (Old Ridge Mountain Road).

DESCRIPTION: White residual clay is present in an exposure that is about 30 to 35 feet high. Some light yellowish-brown and red stain is present on the clay.

FORMATION OR AGE: Residuum over Shady Dolomite.

SAMPLED INTERVAL: Representative sample across 15 feet of clay.

RAW PROPERTIES:

Working properties:	plastic
Water of plasticity:	21.4%
Drying shrinkage:	2.5%
Dry strength:	good
pH:	5.5

SLOW FIRING TEST:

Temp. °C	*Color*	*Hard-ness*	*%Lin. Shk.*	*% Abs.*	*% Appr. Por.*	*Bulk Dens. gm/cc*
1000	White	2	2.5	22.8	37.5	1.64
1050	White	2	2.5	20.9	35.5	1.70
1100	White	3	2.5	16.8	30.8	1.83
1150	Tan	4	7.5	12.4	24.4	1.98
1200	Grayish-brown	5	7.5	9.0	18.8	2.09
1250	Grayish-brown	5	7.5	7.9	16.9	2.15

Remarks: No effervescence with HCl.

PRELIMINARY BLOATING TEST: Negative

PYROMETRIC CONE EQUIVALENT: PCE less than 15

REFLECTANCE TESTS: Brightness 59.8; tint 7.3; whiteness 30.6

POTENTIAL USE: Structural clay products (e.g., building brick, structural tile at 1150-1250°C).

SAMPLE: R-8605 COUNTY: Roanoke

DATE: January, 1983 — Tuscaloosa Research Center

LOCALITY: N4,119,790 E591,680 (Zone 17) Garden City 7.5' quadrangle. Hillside cut, 2 miles southwest of Roanoke, 0.1 mile off the northeast side of U. S. Highway 220 approximately 0.15 mile by road northwest of its intersection with State Road 789 (Old Ridge Mountain Road).

DESCRIPTION: Pale to dark yellowish-orange and reddish-brown soft shale and clay are present in a high hillside cut. The strike of the material appears to be northwest-southeast. Some cream-white clay is present in the shale.

FORMATION OR AGE: Rome Formation

SAMPLED INTERVAL: Representative sample across 10 feet of soft shale and clay.

RAW PROPERTIES:

Working properties:	plastic
Water of plasticity:	31.6%
Drying shrinkage:	2.5%
Dry strength:	good
pH:	5.1

SLOW FIRING TEST:

Temp. °C	*Color*	*Hard-ness*	*%Lin. Shk.*	*% Abs.*	*% Appr. Por.*	*Bulk Dens. gm/cc*
1000	Moderate orange	3	5.0	25.0	40.9	1.64
1050	Moderate orange	3	7.5	19.9	35.6	1.78
1100	Strong brown	4	10.0	11.5	23.8	2.08
1150	Strong brown	4	12.5	6.4	14.4	2.27
1200	Moderate reddish-brown	4	12.5	2.3	5.6	2.42
1250	Moderate reddish-brown	5	12.5	1.8	4.3	2.42

Remarks: Slightly high shrinkage at 1150-1250°C.

PRELIMINARY BLOATING TEST: Negative

POTENTIAL USE: Structural clay products (e.g., building brick, floor brick at 1100-1250°C).

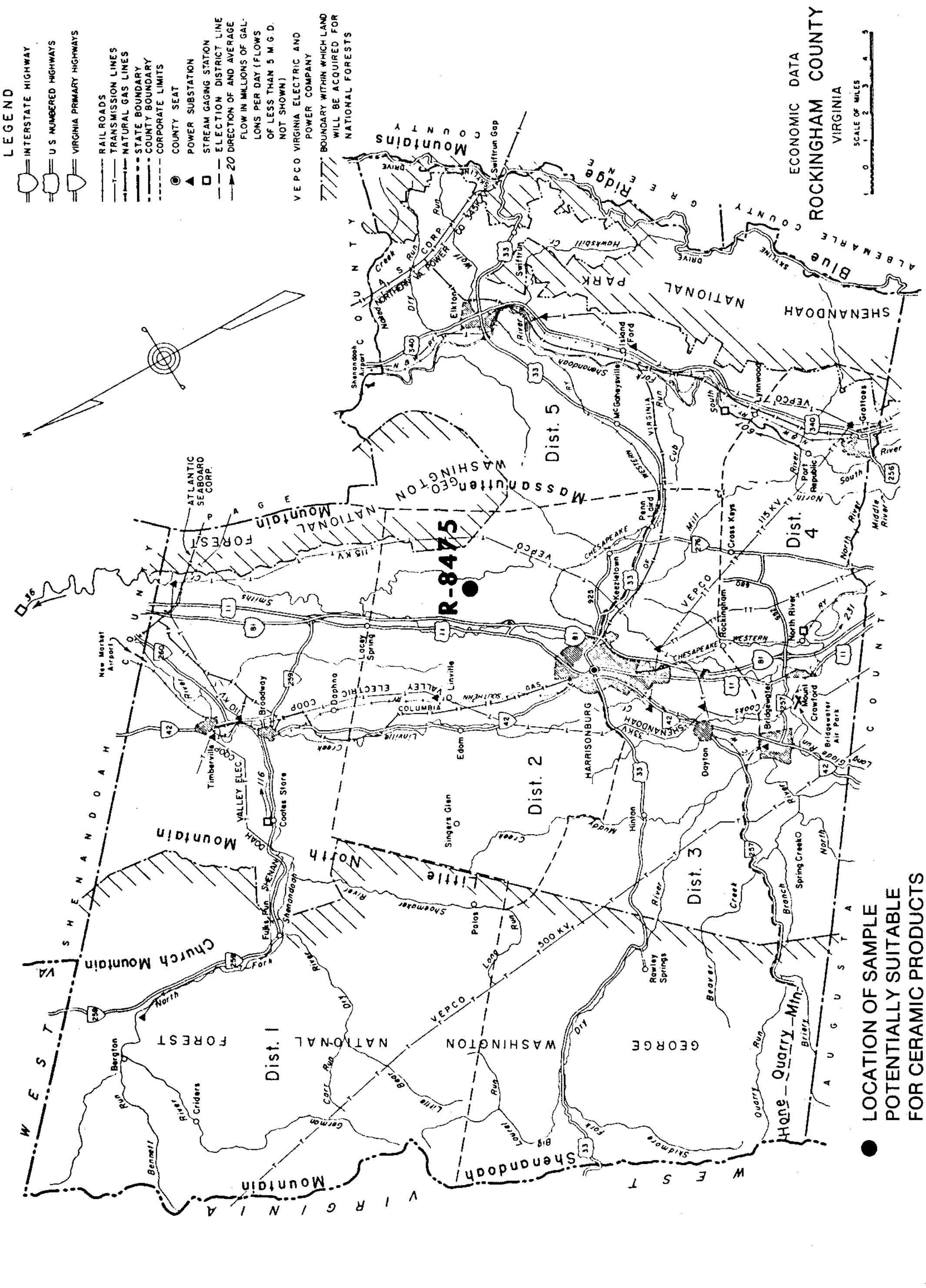

LEGEND
ECONOMIC DATA
ROCKINGHAM COUNTY
VIRGINIA
R-8475
LOCATION OF SAMPLE POTENTIALLY SUITABLE FOR CERAMIC PRODUCTS

Figure 27.

SAMPLE: R-8475 COUNTY: Rockingham

DATE: October, 1981 — Tuscaloosa Research Center

LOCALITY: N4,261,640 E694,160 (Zone 17) Harrisonburg 7.5' quadrangle. Roadcut, 4.0 miles south of Lacey Springs on the northwest side of State Road 717 approximately 300 feet by road southwest of its intersection with State Road 724 heading southeast.

DESCRIPTION: Dark red to moderate reddish-orange clay is present in a 150-foot-long roadcut that has a maximum height of 8 feet. Some pale orange and grayish-orange plastic clay mottling is present near the base of the exposure. Two feet of silty brown overburden is present.

FORMATION OR AGE: Residual clay

SAMPLED INTERVAL: Representative channel sample across 6 feet of clay

RAW PROPERTIES:

Working properties:	plastic
Water of plasticity:	31.4%
Drying shrinkage:	5.0%
Dry strength:	good
pH:	4.1

SLOW FIRING TEST:

Temp. °C	*Color*	*Hard-ness*	*%Lin. Shk.*	*% Abs.*	*% Appr. Por.*	*Bulk Dens. gm/cc*
1000	Moderate orange	5	7.5	19.1	34.7	1.82
1050	Brownish-orange	6	12.5	11.8	24.9	2.10
1100	Brownish-orange	6	15.0	3.8	9.2	2.43
1150	Strong brown	6	15.0	2.6	6.4	2.44
1200	Strong brown	6	15.0	2.4	6.0	2.44
1250	Moderate reddish-brown	7	15.0	1.7	4.2	2.46

Remarks: Abrupt vitrification between 1050°-1100°C, high shrinkage at 1050°-1250°C; no effervescence with HCl.

PRELIMINARY BLOATING TEST: Negative

POTENTIAL USE: Marginal for structural clay products (e.g., building brick at 1000°C).

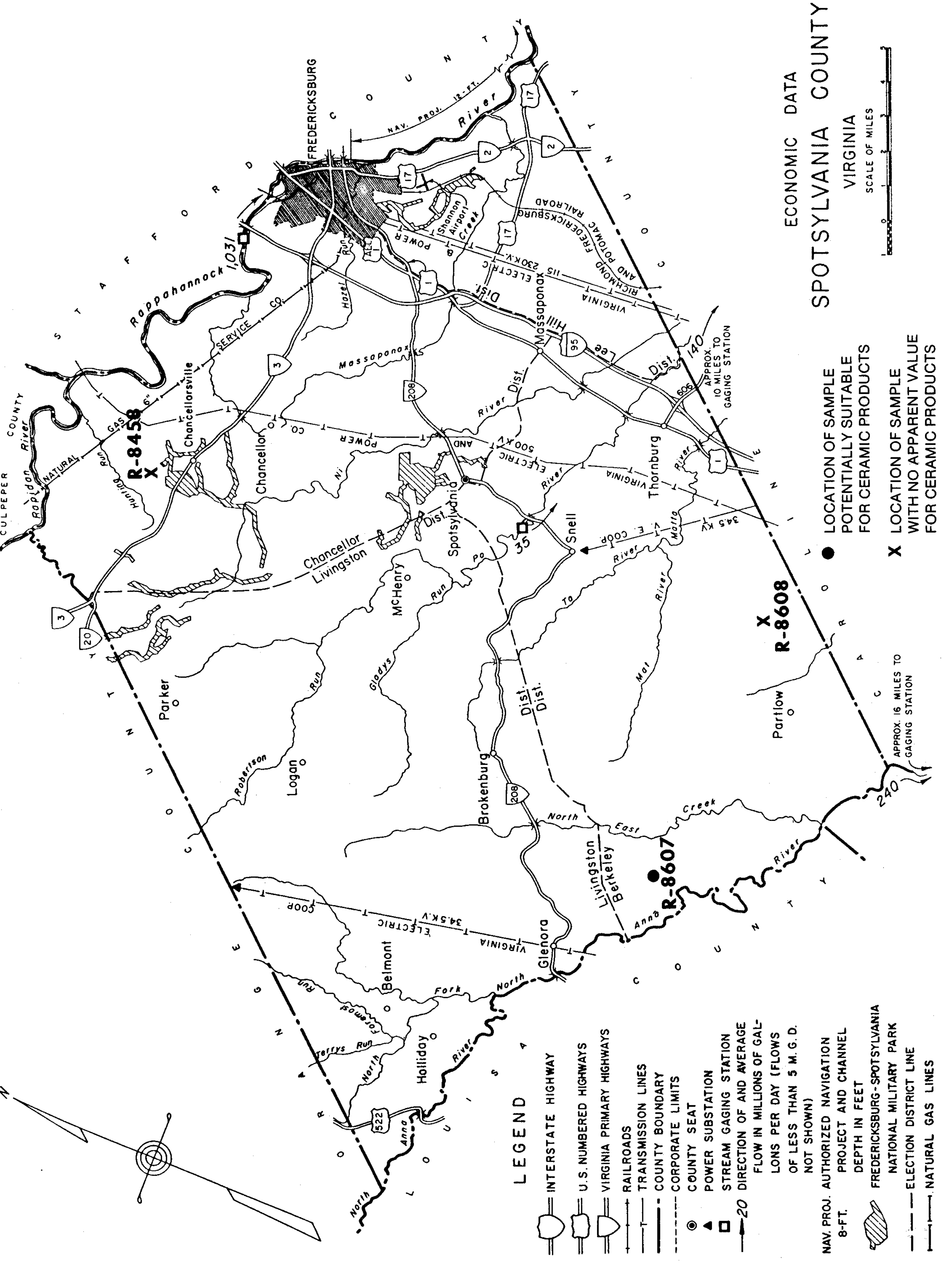

ECONOMIC DATA
SPOTSYLVANIA COUNTY
VIRGINIA
SCALE OF MILES
● LOCATION OF SAMPLE POTENTIALLY SUITABLE FOR CERAMIC PRODUCTS
X LOCATION OF SAMPLE WITH NO APPARENT VALUE FOR CERAMIC PRODUCTS
LEGEND
INTERSTATE HIGHWAY
U.S. NUMBERED HIGHWAYS
VIRGINIA PRIMARY HIGHWAYS
RAILROADS
TRANSMISSION LINES
COUNTY BOUNDARY
CORPORATE LIMITS
COUNTY SEAT
POWER SUBSTATION
STREAM GAGING STATION
DIRECTION OF AND AVERAGE FLOW IN MILLIONS OF GALLONS PER DAY (FLOWS OF LESS THAN 5 M.G.D. NOT SHOWN)
NAV. PROJ. 8-FT. AUTHORIZED NAVIGATION PROJECT AND CHANNEL DEPTH IN FEET
FREDERICKSBURG-SPOTSYLVANIA NATIONAL MILITARY PARK
ELECTION DISTRICT LINE
NATURAL GAS LINES
R-8458
R-8608
R-8607
FREDERICKSBURG
Chancellorsville
Chancellor
Spotsylvania
Massaponax
Thornburg
Snell
McHenry
Parker
Logan
Partlow
Brokenburg
Belmont
Glenora
Holliday
STAFFORD COUNTY
CAROLINE COUNTY
LOUISA COUNTY
ORANGE COUNTY
CULPEPER COUNTY
Rappahannock River
Rapidan River
North Anna River
Po River
Ni River
Ta River
Mat River
Matta River
Massaponax
NAV. PROJ. 12-FT.
APPROX. 10 MILES TO GAGING STATION
APPROX. 16 MILES TO GAGING STATION
RICHMOND FREDERICKSBURG AND POTOMAC RAILROAD
VIRGINIA ELECTRIC AND POWER CO.
SERVICE CO. NATURAL GAS 6"
V. E. COOP 34.5 KV
Chancellor Livingston
Livingston Berkeley
Lee Dist.
Hill Dist.

Figure 28.

SAMPLE: R-8458 COUNTY: Spotsylvania

DATE: June, 1981 — Tuscaloosa Research Center

LOCALITY: N4,244,530 E269,060 (Zone 18) Chancellorsville 7.5' quadrangle. Roadcut 1.0 mile northwest of Chancellorsville, on the east side of State Road 610 approximately 0.05 mile by road north of its intersection with State Road 616.

DESCRIPTION: Light brown, moderate yellowish-brown, and light grayish-red plastic clay is present in a 150-foot-long roadcut that has a maximum height of 4 feet. Dusky yellow to pale olive schist occurs in the middle of the exposure. The strike of the schist is N25°E, and the dip is vertical. Some quartz pebbles are also present in the exposure.

FORMATION OR AGE: Residual clay

SAMPLED INTERVAL: Composite of 2 channel samples from the highest part of the exposure.

RAW PROPERTIES:

Working properties:	plastic
Water of plasticity:	39.4%
Drying shrinkage:	5.0%
Dry strength:	good
pH:	4.0

SLOW FIRING TEST:

Temp. °C	*Color*	*Hard-ness*	*%Lin. Shk.*	*% Abs.*	*% Appr. Por.*	*Bulk Dens. gm/cc*
1000	Strong orange	3	5.0	33.3	49.2	1.48
1050	Moderate orange	3	10.0	27.8	45.0	1.62
1100	Deep orange	5	12.5	17.2	33.4	1.95
1150	Brownish-orange	6	15.0	12.9	27.3	2.11
1200	Brownish-orange	6	15.0	11.5	24.7	2.15
1250	Brownish-orange	6	15.0	9.3	20.3	2.18

Remarks: High shrinkage; no effervescence with HCl.

PRELIMINARY BLOATING TEST: Negative

POTENTIAL USE: Not suitable for structural clay products.

SAMPLE: R-8607 COUNTY: Spotsylvania

DATE: March, 1983 — Tuscaloosa Research Center

LOCALITY: N4,216,940 E259,550 (Zone 18) Lake Anna East 7.5' quadrangle. Roadcut, 3.5 miles southeast of Glenora, on the southeast side of State Road 614 approximately 0.15 mile by road northeast of its intersection with State Road 601.

DESCRIPTION: Yellowish-gray, yellowish to very pale orange, light brown and some red plastic clay is present in a 225-foot-long roadcut that has a maximum height of 7 feet. The clay becomes very gritty toward the base of the exposure and contains some quartz and feldspar fragments. Six inches of brown loamy overburden is present.

FORMATION OR AGE: Residual clay

SAMPLED INTERVAL: Channel across 4 feet of clay.

RAW PROPERTIES:

Working properties:	plastic
Water of plasticity:	30.4%
Drying shrinkage:	5.0%
Dry strength:	good
pH:	4.2

SLOW FIRING TEST:

Temp. °C	*Color*	*Hard-ness*	*%Lin. Shk.*	*% Abs.*	*% Appr. Por.*	*Bulk Dens. gm/cc*
1000	Light orange	3	5.0	23.3	38.3	1.64
1050	Light orange	4	5.0	22.4	37.3	1.67
1100	Light orange	4	7.5	19.6	34.2	1.74
1150	Moderate orange	4	10.0	13.2	25.6	1.94
1200	Brownish-orange	4	10.0	11.8	23.4	1.98
1250	Grayish-reddish-orange	4	10.0	10.1	20.0	1.99

Remarks: Good firing range; no effervescence with HCl.

PRELIMINARY BLOATING TEST: Negative

POTENTIAL USE: Structural clay products (e.g., building brick at 1100°-1250°C).

SAMPLE: R-8608 COUNTY: Spotsylvania

DATE: March, 1983 — Tuscaloosa Research Center

LOCALITY: N4,216,160 E271,840 (Zone 18) Ladysmith 7.5' quadrangle. Roadcut, 2.8 miles northeast of Partlow, at the intersection of State Road 605 with State Road 604.

DESCRIPTION: Pale to dark yellowish-orange, light brown and reddish-brown mottled plastic to gritty clay is present in a 250-foot-long roadcut that has a maximum height of 3.5 feet. Red and cream plastic clay is present towards the base of the exposure. The surface of the exposure weathers to a lighter color.

FORMATION OR AGE: Residual clay

SAMPLED INTERVAL: Composite of 2 channel samples, 25 feet apart, in the thickest part of the exposure.

RAW PROPERTIES:

Working properties:	short
Water of plasticity:	29.8%
Drying shrinkage:	2.5%
Dry strength:	poor
pH:	4.6

SLOW FIRING TEST:

Temp. °C	*Color*	*Hard-ness*	*%Lin. Shk.*	*% Abs.*	*% Appr. Por.*	*Bulk Dens. gm/cc*
1000	Moderate orange	2	2.5	24.5	40.1	1.59
1050	Moderate orange	2	2.5	23.8	39.4	1.64
1100	Deep orange	2	7.5	23.6	39.1	1.64
1150	Brownish-orange	2	7.5	21.9	37.0	1.67
1200	Grayish-reddish-orange	2	7.5	21.2	36.2	1.74
1250	Strong brown	2	7.5	20.8	34.9	1.74

Remarks: Too soft; no effervescence with HCl.

PRELIMINARY BLOATING TEST: Negative

POTENTIAL USE: Not suitable for structural clay products.

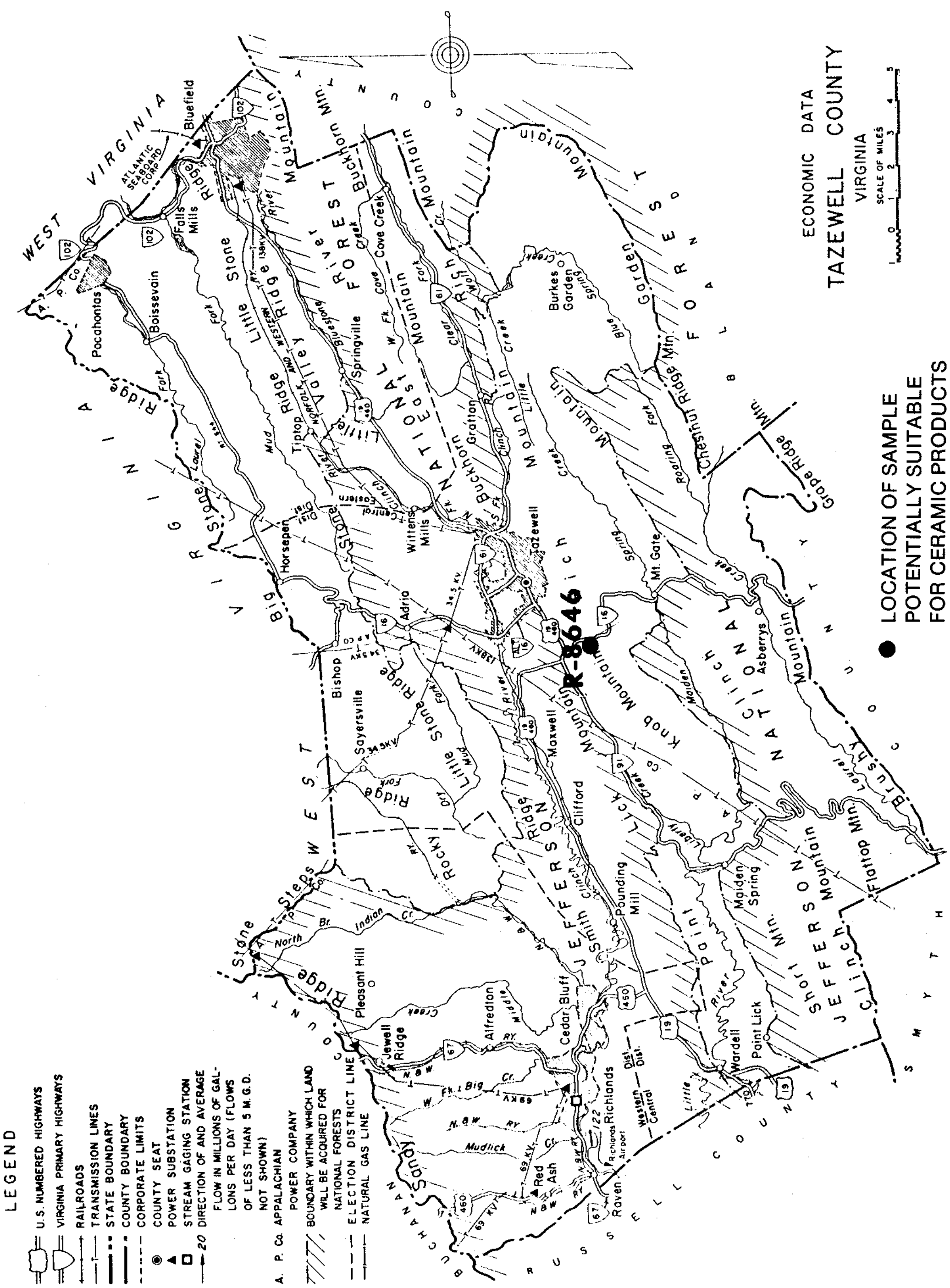

ECONOMIC DATA
TAZEWELL COUNTY
VIRGINIA
SCALE OF MILES
LOCATION OF SAMPLE POTENTIALLY SUITABLE FOR CERAMIC PRODUCTS
R-3646
LEGEND
U.S. NUMBERED HIGHWAYS
VIRGINIA PRIMARY HIGHWAYS
RAILROADS
TRANSMISSION LINES
STATE BOUNDARY
COUNTY BOUNDARY
CORPORATE LIMITS
COUNTY SEAT
POWER SUBSTATION
STREAM GAGING STATION
DIRECTION OF AND AVERAGE FLOW IN MILLIONS OF GALLONS PER DAY (FLOWS OF LESS THAN 5 M.G.D. NOT SHOWN)
A. P. Co. APPALACHIAN POWER COMPANY
BOUNDARY WITHIN WHICH LAND WILL BE ACQUIRED FOR NATIONAL FORESTS
ELECTION DISTRICT LINE
NATURAL GAS LINE
WEST VIRGINIA
Bluefield
Pocahontas
Boissevain
Falls Mills
Tazewell
Richlands
Cedar Bluff
Pounding Mill
Maxwell
Clifford
Bishop
Jewell Ridge
Burkes Garden
JEFFERSON NATIONAL FOREST

Figure 29.

SAMPLE: R-8646 COUNTY: Tazewell

DATE: November, 1983 — Tuscaloosa Research Center

LOCALITY: N4,104,330 E450,860 (Zone 17) Tazewell South 7.5' quadrangle. Roadcut, 2.75 miles southwest of Tazewell, on the west side of Virginia Highway 16 about 0.6 mile by road north of its intersection with State Road 604.

DESCRIPTION: Very light gray shaly bentonite, with a yellowish-gray to light olive-gray surface, is present in a long roadcut that has a maximum height of 15 feet. The bentonite, which is overlain by a dense gray limestone, and overlies an arenaceous thin-bedded limestone, has a strike of N40°E and a dip of 9°NW.

FORMATION OR AGE: Ordovician

SAMPLED INTERVAL: Representative channel sample across 6 inches of bentonite.

RAW PROPERTIES:

Working properties:	plastic
Water of plasticity:	19.3%
Drying shrinkage:	5.0%
Dry strength:	good
pH:	7.2

SLOW FIRING TEST:

Temp. °C	*Color*	*Hard-ness*	*%Lin. Shk.*	*% Abs.*	*% Appr. Por.*	*Bulk Dens. gm/cc*
1000	Moderate orange	3	5.0	20.8	35.5	1.71
1050	Moderate orange	3	5.0	20.3	35.1	1.73
1100	Light brown	3	5.0	19.3	33.6	1.74
1150	Moderate-reddish-brown	5	10.0	6.3	13.0	2.07
1200	—	—	Melted	—	—	—
1250	—	—	—	—	—	—

Remarks: Short firing range (abrupt vitrification between 1000°-1150°C and 1150°-1200°C); no effervescence with HCl.

PRELIMINARY BLOATING TEST: Negative

POTENTIAL USE: Marginal for structural clay products (e.g., building brick at 1150°C).

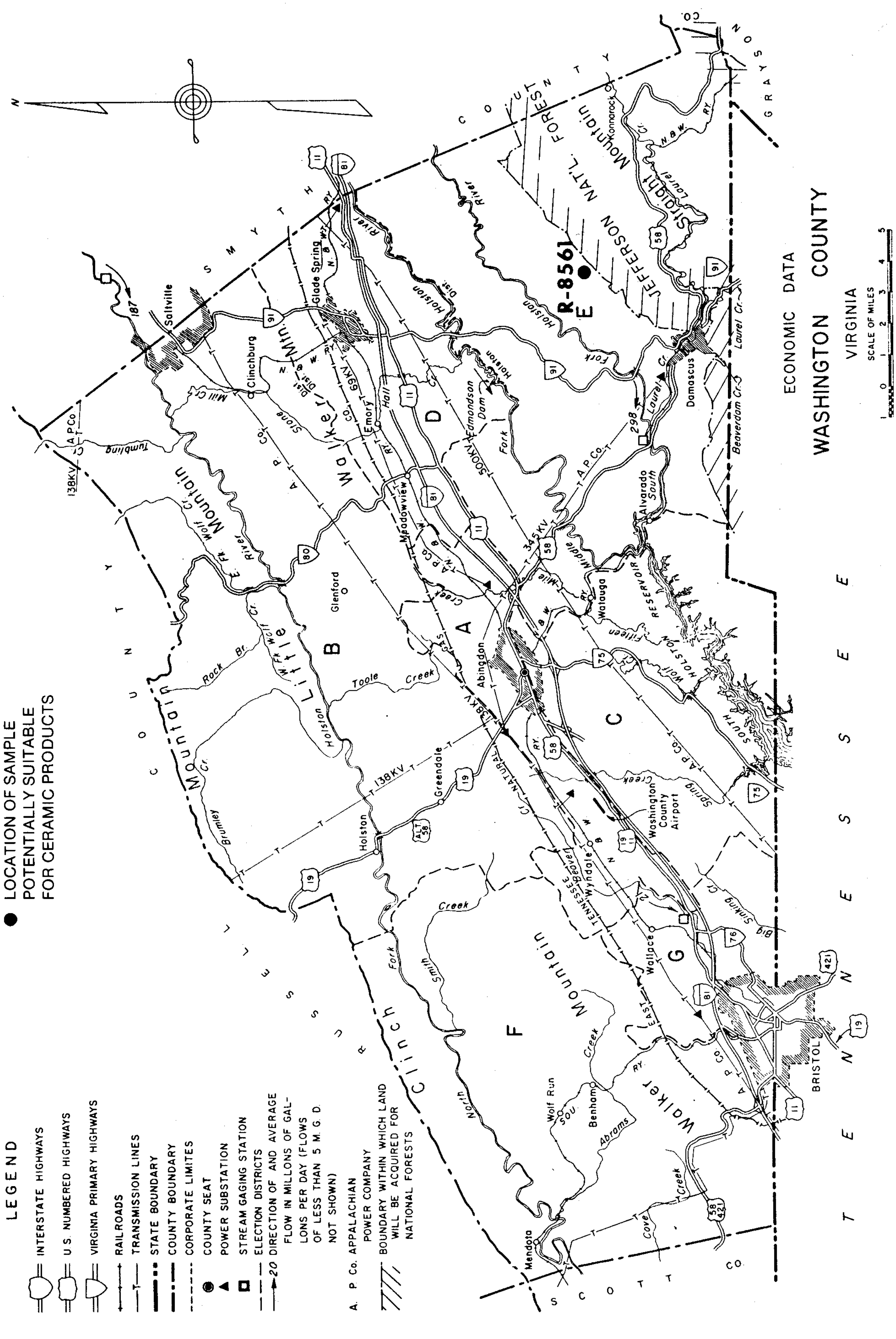

LOCATION OF SAMPLE POTENTIALLY SUITABLE FOR CERAMIC PRODUCTS
R-8561
LEGEND
INTERSTATE HIGHWAYS
U.S. NUMBERED HIGHWAYS
VIRGINIA PRIMARY HIGHWAYS
RAILROADS
TRANSMISSION LINES
STATE BOUNDARY
COUNTY BOUNDARY
CORPORATE LIMITES
COUNTY SEAT
POWER SUBSTATION
STREAM GAGING STATION
ELECTION DISTRICTS
20 DIRECTION OF AND AVERAGE FLOW IN MILLONS OF GALLONS PER DAY (FLOWS OF LESS THAN 5 M. G. D. NOT SHOWN)
A. P. Co. APPALACHIAN POWER COMPANY
BOUNDARY WITHIN WHICH LAND WILL BE ACQUIRED FOR NATIONAL FORESTS
ECONOMIC DATA
WASHINGTON COUNTY
VIRGINIA
SCALE OF MILES
SMYTH COUNTY
RUSSELL COUNTY
SCOTT CO.
GRAYSON CO.
TENNESSEE
Saltville
Glade Spring
Clinchburg
Emory
Meadowview
Glenford
Abingdon
Greendale
Holston
Damascus
Alvarado
Konnarock
Watauga
Washington County Airport
Wyndale
Wallace
Bristol
Benhams
Wolf Run
Mendota
JEFFERSON NATL. FOREST
South Holston Reservoir
Walker Mtn.
Little Mountain
Clinch Mountain
Walker Mountain
Straight Mountain

Figure 30.

SAMPLE: R-8561 COUNTY: Washington

DATE: August, 1982 — Tuscaloosa Research Center

LOCALITY: N4,059,380 E433,920 (Zone 17) Konnarock 7.5' quadrangle. East wall of abandoned manganese pit (Widner Valley mine) of Colitz Mining Co., 4 miles northeast of Damascus at the end of a private road (0.8 mile long) along Buzzard Den Branch, off the east side of State Road 605.

DESCRIPTION: White residual clay is present as a thin zone in a large bank cut of the abandoned Widner Valley mine. The clay contains some yellowish-orange iron oxide stain as well as small pieces of manganese minerals.

FORMATION OR AGE: Residuum over Shady Dolomite

SAMPLED INTERVAL: Grab sample of material in side of the bank.

RAW PROPERTIES:

Working properties:	plastic
Water of plasticity:	30.1%
Drying shrinkage:	2.5%
Dry strength:	good
pH:	4.4

SLOW FIRING TEST:

Temp. °C	*Color*	*Hard-ness*	*%Lin. Shk.*	*% Abs.*	*% Appr. Por.*	*Bulk Dens. gm/cc*
1000	Pale yellwish-pink	3	5.0	25.6	38.7	1.46
1050	Pale yellowish-pink	3	5.0	24.1	37.5	1.61
1100	Pale yellowish-pink	4	7.5	17.5	31.5	1.80
1150	Pale yellowish-pink	6	10.0	9.2	19.0	2.06
1200	Yellowish-gray	6	12.5	4.2	9.4	2.23
1250	Yellowish-gray	6	12.5	2.8	6.5	2.28

Remarks: Slightly high shrinkage at 1200°-1250°C; no effervescence with HCl.

PRELIMINARY BLOATING TEST: Negative

REFLECTANCE TESTS: Brightness 72.0; tint 4.0; whiteness 56.0

POTENTIAL USE: Structural clay products (e.g., building brick at 1100°-1250°C).

GLOSSARY

Absorption (Abs.)—The relationship of the weight of water absorbed by a ceramic specimen to the weight of the specimen before immersion in water, expressed as a percent.

Apparent porosity (Appr. Por.)—The ratio of the volume of open pores in a specimen to the bulk volume, usually expressed in percent.

Bloating test—A test to determine the ability of a ceramic material or product to expand when heated. Data on this test reported here are chiefly preliminary. The results are reported as "negative," meaning no bloating—or "positive."

Bonding clay—A clay of high plasticity and high dry strength used to bond nonplastic materials; it may or may not be refractory.

Brightness—A percentage of the light that would be reflected under the same geometric conditions if the perfectly reflecting and diffusing ideal white standard were substituted for the specimen.

Bulk density—The weight of a solid per unit of exterior volume expressed in gm/cc or lb/ft^3.

Ceramic products—Articles formed at least partly of clay materials and fired.

Color—As used in slow firing test, is based on Munsel Book of colors, 1973, neighboring Hues Edition: Newburg, New York, Kollomorgan Corp.

Diatomaceous—Containing microscopic shells composed of siliceous material.

Drying characteristics—Characteristics which develop in, or on, a ceramic body upon drying, such as strength, warping, etc.

Drying defects—Features such as cracking, warping, and efflorescence which develop during the drying of a ceramic body.

Drying shrinkage—The percent of linear change of a ceramic body upon drying, usually at 110°C.

Dry strength—The mechanical strength of a ceramic body after being dried, usually at 110°C.

Efflorescence—The staining of a masonry surface as a result of the deposition of water-soluble salts.

Extrusion—The forcing of clay material through an opening or die to form a continuous body of like cross section throughout its length.

Face brick—Brick of various colors, often with imparted surface texture, manufactured especially for use in exposed walls or masonry units. Face bricks are designated "NW", "MW", or "SW" to indicate suitability for use under negligible, mild, or severe weather conditions.

Flux—A substance that promotes fusion in a given ceramic mixture.

Grog—Ground up pieces of burned brick or clay added to the raw clay mixture for the purpose of decreasing the shrinkage and density of the burned ware.

Hardness—The resistance to scratching or abrasion expressed verbally, or by Mohs scale of hardness as follows:

Moh's
1. talc
2. gypsum
3. calcite
4. fluorite
5. apatite
6. orthoclase feldspar
7. quartz

lb./ft.^{3}—Pounds per cubic foot.

Lightweight aggregate—Aggregate produced by expanding, or bloating, of such materials as clay, shale, or slate which have been heated.

Linear shrinkage—The percent of linear contraction of a ceramic body, measured both after drying and after firing.

Loss on ignition (L.O.I.)—The loss in weight, expressed in percent, which results from heating a sample of material to a high temperature, after preliminary drying at a temperature just above the boiling point of water.

Mealy—A granular feel caused by lumpy, soft particles.

Mineral filler—An inert mineral substance added to certain manufactured products to impart desirable properties such as weight, wear resistance, and opacity.

pH—Hydrogen ion concentration; a measurement of acidity or alkalinity.

Plasticity—The property of a moistened material to be deformed under pressure, with the deformed shape being retained when the deforming force is removed.

Porous clay products—Clay products capable of absorbing moisture, such as flower pots and garden pottery.

PSI—Pounds per square inch.

Pyrometric cone—A trigonal cone, standardized as to shape and softening point, used as a control in firing ceramic products.

Pyrometric cone equivalent (PCE)—The designation number of a pyrometric cone which softens simultaneously with a cone of the ceramic material under investigation when tested in accordance with a standard method of testing.

Reflectance—A measure of the ability of a body to reflect light.

Refractories—Materials, usually non-metallic, used to withstand high temperature.

Residual clay—A clay deposit formed by the decay of rock in place.

Shrinkage—The reduction in size of ceramic material upon drying and firing.

Slow firing test—A test to determine the firing characteristics of ceramic raw material in which dried samples are fired in a kiln started at room temperature and raised to a maximum temperature over a period of hours. Samples removed at specific temperatures are evaluated for hardness, color, percent of total linear shrinkage, percent absorption, percent apparent porosity, and bulk density. (Morse Laboratories fired briquets together for two successive firing temperatures. The first set was removed as soon as the designated temperature was reached; when the second temperature was reached, after which the kiln was shut down and the second set of briquets was left in the kiln to cool.) Testing ends upon fusion of the sample material.

Stoneware—Fine texture ceramic products, either vitreous or semivitreous, generally made from low-grade plastic fireclay.

Structural clay products—Any of a class of load-bearing, ceramic building units.

Surface checking—Fine cracks on a fired ceramic surface.

Tint—Quality by which an object color is judged to depart from a preferred white toward yellow.

Vitrification—The continual reduction in porosity of a ceramic object or material as a result of firing.

Water of plasticity—The percent of water required to make a clay material plastic.

Whiteness—An expression defining the nearness of approach of a color to a true white.

Workability—The consistency and moldability of plastic ceramic materials.